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NOVEMBER 1920.

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The Mysore Economic Journal

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DEVELOPMENT OF THE RESOURCES OF MYSORE STATE.

BY SIRDAR M. KANTARAJ URS,
C.S.I., B.A.,
Dewan of Mysore.

[*Concluding his address to the Mysore Representative Assembly, which opened on 25th Oct. 1920, at Mysore, Sirdar M. Kantaraj Urs said as follows:*—]

The State is fortunate in possessing a most carefully elaborated system of irrigation by tanks, the capitalised value of which is estimated at over 7 crores of rupees. But no satisfactory methods have yet been devised to maintain this valuable property in an efficient condition. By the ancient custom of the country, it is the duty of raiyats holding lands under irrigation tanks to maintain them in an efficient condition, and although the obligation has not been questioned, it has never been satisfactorily discharged. In 1866, the late Mr. Bowring, then Chief Commissioner, said: "Of late years, the raiyats have silently ignored their obligations and the whole duty and cost of repairing tanks both in regard to the requisite labour and material have fallen on Government." But it was manifestly impossible for Government to undertake the petty annual repairs of over 26,000 tanks scattered all over the State, and the raiyats' liability was re-imposed by the issue of rules in 1873, which are practically in force to-day. There has, however, been great difficulty in enforcing them, owing to the decline of the communal spirit, the absenteeism of landlords and the absence of any penalty for non-performance. Various methods have been tried in recent years, either by way of commuting the liability by the imposition of an acreage cess or of attempting to revive the communal spirit by the formation of village statutory bodies under the Tank Panchayat Regulation. None of the measures have proved successful so far. Government have endeavoured during the year to provide a solution, the chief features of which are the contribution by Government of the cost of half the repairs by remission of the Irrigation Cess to the villages that discharge this duty satisfactorily, the imposition of a penalty equivalent to double the cost of maintenance in the case of defaulting raiyats, and the delegation of this duty to Village Improvement Committees wherever Tank Panchayets have not been formed. I would earnestly request the members of this Assembly to afford their full and hearty co-operation in giving a trial to the rules now framed; for, I am sure, you recognise that the agricultural prosperity of our State greatly depends on the careful preservation of its invaluable irrigational assets.

INDIAN INSTITUTE OF SCIENCE.

The report of the Chemical Services Committee proves the urgent importance of establishing Chemical Research Institutes if

Government should desire to promote industrial enterprise under our present conditions in India. The Committee recommend the constitution of an All-India Chemical Service and the establishment of Research Institutes under provincial control in various parts of the country together with an Imperial Institute with advisory functions under the Government of India. The governing body of the Indian Institute of Science has also come to the conclusion that a change in the main object with which it was originally established, namely, that of providing a post-graduate University training, is called for by the present trend of conditions in India. Government are naturally keenly interested in these questions and have under their consideration the changes in their relations with the Indian Institute of Science which they will submit for the decision of the Government of India when the question of the future constitution of the Institute comes up before them for consideration.

FINANCIAL FACILITIES TO TRADE AND INDUSTRY.

(*a*) *The Bank of Mysore.*—During the early part of this year the Government appointed a committee, presided over by the First Member of Council, to consider and report the directions in which the work of the Bank of Mysore may be improved. Since its establishment seven years ago, the Bank has made steady progress but the resources at its disposal are not adequate for meeting the growing demands of business and a large portion of the trade of the State is still untouched. There was also a gradual decrease in the ratio of capital and reserve to deposits which were expanding rapidly, and no action had been taken in regard to the transfer of Treasury work to the Bank as contemplated at the time of its establishment. Government have recently passed orders on the recommendations of the committee. The policy that dictated the establishment by Govern-

in the State has been abundantly vindicated in the signal assistance which the Bank of Mysore has rendered in the floatation of the recent loan, and Government expect that, after the measures now sanctioned are brought into force, the Bank will gain in prestige and financial standing and will be of even greater assistance in developing the resources of the State.

(*b*) *The Co-operative Movement.*—Government have recently announced the appointment of a committee on Co-operation. The Co-operative movement has caught on in Mysore quite as effectually as in other parts of India so that we have at present 1,400 societies serving 92,600 members with a working capital of Rs. 78 lakhs. But there are certain unsatisfactory features about it which the Government wonld be glad to have examined by an expert committee. The movement has not thriven in the Malnad part of the State which is probably in greater need of an agency for cheap credit than the Maidan and associations for other than credit purposes have hardly succeeded anywhere. Even in regard to the work done in the field of credit it was revealed in an investigation of the affairs of 350 societies that the financial indebtedness of the members had undergone no change except that half of it was transferred from the sowcar to the society and that their assets had increased by 16 per cent, Government have been fortunate in securing as Chairman of the committee one of the well known members of the Committee on Co-operation appointed by the Government of India a few years ago.

INCREASING THE EFFICIENCY OF THE PEOPLE.

I have already explained that the educational measures the Government propose to adopt with a view to increase the efficiency of the people will be dealt with in the order on the Educational Memorandum which will soon be published and I have also dealt with

Improvement Committee in order to ensure due attention to the problems presented by that part of the State. The only other matters to which a brief allusion may be made under this head are (1) the amelioration of the condition of the depressed classes, and (2) the problems of City Improvement.

The Depressed Classes.—The question of improving the condition of the depressed classes was very ably discussed at the Birthday Session of the Representative Assembly and also at one of the meetings of the Economic Development Board. As you will easily recognise, the question is not free from difficulties. There is no doubt that some sort of State action is called for as the depressed classes, in their present condition, are incapable of self-help and it is impossible to expect any private agency to co-ordinate the work of a number of Government departments whose active sympathy and support are essential, if any real improvement is to be effected in their condition. But it will not do to minimise the danger of unsettling the minds of a large community and withdrawing its members from the work they are now accustomed to without, at the same time, providing them with avenues of employment suited to their roused aspirations. In any case, the problem of ameliorating the condition of nearly one-sixth of our population at present sunk in poverty and ignorance is far too stupendous a task to be tackled even by a Government agency however well-equipped. The question as to the best lines on which this might be attempted has recently been referred to a committee whose report will be earnestly awaited by Government.

PROBLEMS OF CITY IMPROVEMENT.

(*a*) *In Bangalore.*—Government have reviewed in detail the work done in connection with the city improvement in Bangalore since the constitution of the first Improve- ... of over providing the city with drinking water, electric lighting, in measures relating to drainage and in laying out its extensions. New problems have arisen with the advent of new conditions consequent on the growth of the city in size, population and importance. Government have indicated the new improvements urgently needed which are estimated to cost about Rs. 13 lakhs to finance which a grant of Rs. 3 lakhs per annum has been sanctioned. The Improvement Committee has been re-constituted in order to carry out this programme. The city has never been provided with a proper drainage system. A comprehensive scheme, capable of being taken up in sections and estimated to cost in the aggregate about 18½ lakhs of rupees, has been prepared. Government have promised to pay half the cost of the scheme provided the balance required is found by the Municipal Council. The entire system of water-supply, which was laid out over 25 years ago, requires renovation and extension. An expert committee has been appointed to go into the whole question and submit a report.

(*b*) *In Mysore.*—The improvement of the Mysore City commenced with the establishment of a Special Sanitary Division, under the late Mr. Standish Lee in 1892. A sum of Rs. 52 lakhs has also been spent in Mysore up to date in the acquisition of properties in congested areas, in sewerage and drainage works, laying out of extensions, water-supply and model house building. Still, it cannot be said that the sanitary condition of the capita[l] city is all that can be desired. The sewerag[e] and drainage works are not yet complete an[d] sufficient attention has not been paid to hous[e] connection. All the population displaced i[n] consequence of the acquisition of propertie[s] has not been provided with houses. Th[e] construction of new houses in order to avoi[d] over-crowding is an urgent necessity. Th[e] further improvements required are divid[ed] into the classes, productive and non-produ[ctive]

loans and the latter out of an annual State grant of Rs. 4½ lakhs.

With a view to enable the cities to carry out their productive works and to solve the housing problem, it is absolutely necessary that the two premier municipalities should evolve some means of raising loans from the general public. Government have indicated that they are prepared to consider any workable scheme involving a reasonable contribution from State funds to bridge the difference between the rate of interest at which they have to borrow and the rate they charge for their loans. The great example which has recently been set by Bombay is likely to be largely copied by the other leading cities in India and Government earnestly trust that the local authorities responsible for the administration of our two premier municipalities will not be slow to appeal to the civic patriotism of their moneyed classes to finance schemes of local importance.

CONCLUSION.

I have now placed before you the most salient features of the past year's administration and some of the more important questions now demanding your attention. The march of events elsewhere has begun to affect us in a manner to which we were not accustomed before the war and it is therefore of vital importance to us to organize and strengthen our social and economic fabric so as to be able to rely more and more on our own resources and be less at the mercy of these unknown factors. The violent convulsions through which society has passed in many parts of the world—though we have been fortunately free from their direct effects—the breaking up of class privileges and distinctions, and an increasing political consciousness have made the demand for equality of opportunities more and more insistent throughout the world and the problem of the advancement of the relatively backward classes without in any ... for solution everywhere and is also engaging our most anxious consideration. Political reforms of a far-reaching character are in the process of introduction in British India and the whole political atmosphere is in a state of voilent disturbance through various causes. These changes do not at present directly affect us, our conditions being so different. In all questions of imperial policy that may involve the interests of the State, the powers of His Highness the Maharaja to safeguard them remain unaffected. With us, there is no cleavage between official and non-official interests aud there is already considerable association of the non-official element in the ordinary administration. Subject to certain limitations, imposed by the nature of our constitution, His Highness the Maharaja has been graciously pleased to give the people ample opportunities to place their views before his Government on all important legislative, fiscal and administrative measures, and to take a considerable part in the administration. It is for you to take full advantage of these opportunities, to make yourselves more and more responsible for local affairs, to strengthen the foundations of the existing assemblies and councils and qualify yourselves for an increased share in the administration. The financial situation also needs at present your earnest co-operation. The increasing demands of a progressive administration and the policy we have adopted of a large expansion in education and providing assistance to the people in the development of agriculture and industries, have made the problem one of the greatest difficulty at a time when our resources have been affected by causes over which we have no control. You will appreciate the complexity, the importance and the gravity of the various economic, social and other problems that Government are called upon to solve and I feel confident that I am not appealing in vain to your patriotism and public spirit when I ask you to co-operate in carrying out the beneficent intentions of our beloved Ruler for the advancement of his

SUGAR FACTORIES—A JAMAICAN EXAMPLE.

By THE EDITOR.

IN the *Journal of Jamaica Agricultural Society*, we read of the success that has attended a sugar factory started there some-time ago. The particulars given show how well the Factory has succeeded. In India, we have yet to make much headway in the matter. So the Jamaican example ought to prove of some interest. The Company in question, the Antigua Sugar Factory Company has, we are told, completed the 15 years covered by its agreement with the Government. The value of the case lies not only in its local success but in the object lesson which it should give to other places. The short facts of the scheme were as follows:

(*a*) The Government provided £15,000 and the company £25,000, making a total of £40,000, for the erection of a factory to make 3,000 tons of sugar in the season. The factory was duly erected, the actual cost being £ 45,358, approximately £ 15 per ton of sugar capacity. It made its first crop in 1905. It has since grown to 10,000 tons sugar capacity, and the total cost of capital account has been £103,229, or £10 6s. per ton. (*b*) The Government stipulated for fair co-operative terms for the original contracting planters, and that, at the end of 15 years, shares representing half the value of the factory should be made over to these. They have received high prices for their canes, the rate averaging in recent years over 9 per cent on the f.o.b. price of sugar without any deduction for cost of bags or export taxes the factory also bearing the cost of transport of canes from the estates. These terms are probably much in excess of what has been paid in any other part of the world, and these of charge. This result has come not only from their being contracting planters, but also because of their being placed in the position of shareholders in respect of the £15,000 subscribed by the Government. (*c*) The Government also stipulated for fair rates for canes from present growers, and these have received about double the rates previously ruling. Now that the agreement with the Government under which they worked has terminated, and there is no longer any charge on the company for interest and sinking fund for capital outlay, it is proposed to place them on a higher scale of payment for their canes. (*d*) The subscribers of the £25,000 have received for the whole period an average of 20 per cent annually on their capital; they have had their capital repaid in full, and they hold shares representing half the value of the factory, or £51,615, and further they have approximately £18,000 standing at their credit in the company's books. (*e*) Another large section of the planting community has also profited by the factory, and the factory has profited by it—namely, the owners of plantations in the surrounding districts who have joined as new contractors. These have been paid on terms which have included sharing in half profits on each year's working account. The prices for their canes have compared favourably with prices paid elsewhere, their average in recent years being equal to over 7 per cent on the f.o.b. price of sugar, the factory bearing all the charges mentioned above in paragraph "*b*." The results are due, in the first place, to the sound basis on which the work was planned, and then to the improvement in the quality and the increase of the quantity of the work as the years went on. In its first three years the factory took 10 tons of cane to make one ton of sugar, which was just the rate calculated on in advance. Its work steadily improved, and during the last three years it has taken less than nine tons to the ton of ... In the first three years the output

9,586 tons. The improvement in the work gave over 10 per cent more sugar costing nothing, and this, combined with more than trebling the quantity, changed a success into a great success.

These are the facts connected with the Jamaican Company. It shows what success awaits enterprizes of the kind in all cane producing countries. We should be glad to see similar enterprise on the part of our people. We have a government that is always willing to help us; we have an Agricultural Department, which is not only well equipped but also ready to render any aid that is requisite; and as regards land and water, we have plenty of these in our State. All that we require is the spirit of enterprize. It is hardly necessary to add that sugar is to-day a highly paying proposition and if we do not care to take advantage of the present conditions, we never will succeed as either cane growers or sugar refiners. It is to be hoped that further time will not be lost.

Dr. G. Cecchi, Consul for Italy, at the request of his Government issues the following note on the nature of the capital tax in Italy:—Under this tax all property of any kind, lands, buildings, title-deeds, bonds of State loans, shares, etc., owned in Italy by Italian or foreign subjects before January 1, 1920, are liable to the extra tax on capital established by a law passed on April 22, 1920. Properties below 50,000 lire are exempted. In addition all foreign subjects must fill up an exact and complete statement showing their properties in Italy to be presented through the Italian Consulates in the country in which they are living. The statement should be made out on a special form.

EFFICIENCY OF AGRICULTURAL LABOUR.

By D. Ananda Rao, B.Sc.,

Ag. Professor of Agriculture and Superintendent, Central Farm Madras Department of Agriculture.

It was at the first Economic Conference held in Bombay, Dr. Mann read a paper on a similar subject in which he endeavoured to show that the agricultural labourer in this country is not as bad as he is depicted to be by several writers on Indian labour problems, and from certain experiments conducted, he argued that "the ploughman in America using his horses, is 50 per cent more efficient than the ploughman here using bullocks."

It is not my intention to question the figures quoted by Dr. Mann, nor to argue in favour of or against the efficiency of the Indian labourer. Efficiency is after all, only a relative term, and what is considered a piece of efficient work in America may not be judged equally efficient in Britain compared with its own standards or *vice versa*. My object is, taking the labourer in India for what he is worth, to elicit from those more conversant in this important problem, any information on the methods of making labour still more efficient, if it is already so. Personally I am of opinion that there is room for improvement.

In the management of a farm, the handling of labour exercises the greatest tact, skill and patience. Labour has, it is true, suffered in the past at the hands of capital in all parts of the world. India has been no exception to it. In the United Kingdom the expression, "farm hands" is quite common even to-day, and the treatment meted out in this country is not anything that would bring credit to our civilization. But times are

secret that capital is bending its knees before labour even here: that the Indian labourer has not allowed the grass to grow under his feet, but is treading on the heels of his fellow labourers in other parts of the world. Such being the case, there is no other alternative for the employer of the present day than to submit to the signs of the times, and recognize the significance of the turning of the tables.

With an ever increasing labour bill, and a constant fear of labour becoming scarce, the employer should devise ways and means to retain the labour he has secured at a high price, and to maintain it at a high level of efficiency.

Compared with pre-war days, labour costs now at least twice as much. But has its *efficiency increased in proportion?* It could not have been for obvious reasons. On the contrary, famines, bad seasons and high prices have all quickly followed one another, which in all probability have deprived the labourer of his former strength. It may be therefore assumed that during the last four or five years labour has if at all not only not increased in efficiency, but perhaps has cost the employer far more than before. I propose to discuss the very common causes that contribute to bring down labour to a very low state of efficiency and per chance point out certain methods which might help its increase. I should like, however, to make it clear at the outset that I claim no originality for the causes or methods suggested; they are not based on any experiments, but are merely the result of observations made during my experience as an agricultural officer. I believe there are large employers of labour in agricultural operations, in planting districts, in cotton mills, in iron foundaries, and various other bureaus of labour, who I hope will assist us in providing correct information, and I shall be highly flattered if this article provokes investigation and experi-

In the first instance agricultural labour is unable to compete fairly and squarely with other kinds of labour in regard to wages. Agricultural labour is dubbed "unskilled," while a mechanic or a mason is a "skilled" workman. Those of us who know of agricultural operations realize that good ploughing and straight drilling call for as much skill as any of those, which come under the category of "skilled" labour, and the tabooing of all agricultural operations as 'unskilled' is therefore a misnomer. Of late it has become evident that non-agricultural operations like building construction, road making, carpentry are attracting agricultural labour in the vicinity of large towns. In many localities, it is drawn to the hills for works in the plantations and there has been not a little emigration from this part of the country to Ceylon, Burma, and Malaya. With such attractions at their doors, it is not surprising that the best of them are lured away by higher wages, leaving the country with what may be called the rif raf of rural labourers for local field operations. Again, similar occupations which require no greater skill like *e.g.*, cotton ginneries withdraw large numbers of women workers who perhaps get same wages as, if not more than those that are employed in more arduous agricultural operations. Agricultural labourers have of late been taking to apprenticeships in carpentry and smithy because of the bigher wages such operations bring in. It is only an economic problem which has upset the equilibrium, and the agricultural labour has indirectly at least, hit the profession which has been and will be the standby of the nation.

Demanding as it does no small amount of physical endurance, field work is uncongenial, specially to those who are not blessed with robust constitutions. It is monotonous with nothing to look forward to, but the wag it brings. It is possible to relieve the strai by change of occupation. This, however, i

these circumstances inefficiency is likely to take root in all daily tasks. Owing to slack seasons in agricultural operations, the labourers do not find themselves employed throughout the year which necessitates their tiding over seasons of scarcity with what they have saved in seasons of prosperity. And this is not possible when normally the labourer gets just enough to support himself and family. Human labour is often wasted on operations which can be replaced more efficiently by mechanical means. Lifting earth in head loads to level a field instead of using a leveller with a pair of oxen is a case in point. How often is it the experience of an agricultural officer to see human labour inefficiently employed with inefficient implements, no proper supervision, tactless management, thoughtless organization, and injudicious farming.

One of the most difficult things for a farmer to employ efficiently, is his cattle. On large farms, it is perhaps even difficult to estimate correctly the exact number of pairs required for efficient working, when busy and slack seasons alternate. It is an undoubted fact that a deal of organizing capacity is required of an officer to so equip the farm that there is neither scarcity in one nor superfluity in another. The writer obtained not long ago figures relating to the actual number of cattle employed in one of the large Government farms (mixed) during one year. It was found that except during two months of the busiest season only from 50 to 60 per cent of the cattle were utilized per month throughout the year, and during the two busiest months, the number employed rose to about 82 per cent. Even granting 4 days' rest to each pair, during a month, it was calculated that 20 per cent of the cattle including those which were ill were not properly employed, or in other words, there was a wastage in cattle efficiency of about 20 per cent. It is false economy underworking will doubtless swell the farmer's bills. For inefficiency in cattle labour, apart from the inherent inefficiency of the cattle themselves, the men in charge are mainly responsible. Where cattle are worked only for 6 honrs a day instead of 8 hours, and where a man ploughs half an acre, when ¾ of an acre is expected of him, it is beyond doubt that we are not getting the most of our cattle. To these inefficiencies must be added other uncontrolable factors such as illness, rainy days, and slack seasons. On the whole, on mixed farms and with efficient organization, there ought to be little difficulty in keeping the cattle at work over 75 per cent of the total number of working days.

I have indicated briefly where inefficiency occurs. What then are the remedies?

It was pointed out that insufficiency of wages is a fruitful cause of inefficiency of labour. *It is, however, open to question* whether increase in wages would increase efficiency in proportion. This is the first consideration which needs investigation: namely, how far we can increase the wages to obtain the maximum efficiency. It is beyond doubt that Indian agricultural labour, as it exists to-day, is very much underpaid, and so long as this continues, the blame for inefficiency will be laid at the door of the employer. Given similar conditions, it is not at all unlikely that the Indian labourer will rise and compare favourably with his western brother but this remains to be proved by facts. The first principle to bear in mind in mainting labour in efficiency is to keep him beyond penury and want. Only then can the labourer put forth his maximum effort and direct his best attention to the work. Low wages on the other hand will only tend to divert his attention to the considerations of the morrow. How much an agricultural labourer ought to get is a question depending on local conditions. One would

watching its work without creating suspicion, useful results would be obtained.

Payment in kind, instead of in money is perhaps one of the best ways in which the ordinary ryot has solved the question of inefficiency. Such wages will minimise the tendency to extravagant habits. Extra wages can be substituted by perquisites so that the employer wins the good will of his labourers. Encouragement to those who work well during sowing and harvesting seasons by promising 1 or 2 per cent of the total yield will, no doubt, help in achieving the object in view. Presents during festive occasions would stimulate the desire to work whole heartedly for the master. Slackness in work is bound to continue, as long as the labourer feels that he is working for the profit of another, and such feeling can only be counteracted by keeping the labourers, contented and happy in ways similar to those suggested above.

Supervision of labour is much neglected at the present day. Anything that directly tends to improve it will increase efficiency. A cartman who brings sand from a distant river bed, men building a fodder stack, a mason at his culvert, boys tending calves are a few examples out of many, which as at present managed, escape scrupulous supervision. It is not easy to suggest improvements, but the best cure seems to be to educate the labourer to be worthy of his hire. It is beyond the province of this paper to deal with rural education, but it is the duty of state to educate every boy and girl in the country in such a way as to make them realise the high sense of duty in whatever calling they may find themselves in. This again largely depends on the personality of the teachers who can infuse into them lofty ideals which they themselves follow.

For the present at all events, supervision from the most senior officer down to the maistry should be rigorously exercised. It ... fficer to see that men who recognize their responsibility; for, these are the men with whom rests the bulk of supervision. It may be a good plan to give special training under experienced officers before the maistries are confirmed.

Concentration of labour at particular jobs, and not the dissipating of it throughout the farm is one secret of careful supervision. To ensure efficient work it is most desirable to insist that the actual quantity of work turned out in each operation is systematically recorded. To an experienced officer this must be one of the easiest ways of checking supervision. Supervision might be minimised by giving jobs in piece work *i.e.*, by paying a cooly according to the quantity of work turned out, which will be an incentive for a larger wage than what he would get under daily system. There is no doubt a certain amount of supervision is necessary even in such operations, as the tendency would be to sacrifice quality for quantity. One of the best methods of increasing efficiency is to employ labour under share system, for by it the labourer recognises that his efforts contribute directly to the increase of his income inasmuch as he has a claim for a share in the produce. In experimental cultivation, however, this system cannot be permitted. The exact period at which a particular operation should be given to the best advantage on share calls for judgment. In the case of cotton picking, for example, a Manager who pays daily wages when the crop has fully burst, and employs them for share at the end of the season, is held in contempt by his labourers. It must always be recognized that when labourers are paid by methods other than daily wages, the special wage should be so adjusted as to be slightly higher than the daily wage, for only then can it be really attractive.

Henry W. Wolff recommends strongly the method of giving the labonrers a share in the profits in the following words: "Profit sharing means that a well defined share, fixed

enterprise as a whole, shall be handed over to the workmen employed, over and above their ordinary wages. The wages should be fixed to start with and should be of the ordinary level. For profit sharing is not designed as a substitute for part of them—as you place a traveller on fixed pay and on commission—but as an inducement of work of head, hand and eye *beyond* that which is paid for in the regular wage. The labourer should receive his honest pay first." Profit sharing is therefore intended for better intelligence, greater diligence and more thought bestowed by the labourer in his master's work. In a modified form, this system is prevalent in most parts of the country. It is suggested, that in India where the labourer is so much indebted, the extra profits he earns in the way might go to liquidate his liabilities, which he will do, only if the master takes a personal interest in him.

One of the chief causes of inefficiency in farm labour seems to be due to what I would call, a lack of personal touch. Employers of labour are prone to treat their labourers as mere human machines. Fictitious standards of efficiency in work are fixed by men who have not the practical knowledge, so that they become more taskmasters rather than guides and helpers. Personal touch begets personal sympathy, and this is only possible where the officer realises the degree of effort that each field operation such as, ploughing, digging, mhoting, planting or hoeing calls for. This is where the human element comes in. The employer must realise the difficulties of the labourer, not only in his work, but even in his private life and should regard the labourer as one possessing similar flesb and blood to his. I was greatly struck with the very friendly relations that existed between the labourers and the head of a large Government Farm, in North India, which I had the privilege of visiting not part of officers of similar status in other parts of this country. The labourer in this instance would fearlessly approach his superior with his grievances, and his personality averted many a time a strike owing to silly coersion on the part of his farm staff. In the training of agricultural students, neither the student nor the teacher can afford to forget this aspect of human element, in practical work. It is the sacred duty of the teacher to constantly impress upon the student the importance of his knowing the details of practical work, for no other reason than to gauge in later years the correct estimate of a labourer's efforts. The practical student, from his point of view, knowing the ease or difficulty of each operation, should train himself to correctly value the farm labourer. He should realise that practical work in the curriculum is the only way of training him to be a proper supervisor of his labour and of attracting for it his best respect.

A practice prevalent in Britain, which is worthy of adoption elsewhere, is the allotment of small plots of land to labourers for the cultivation of vegetables for themselves in their spare time. Free housing is an admirable method to make the labourer contented. In Coimbatore such a practice is very common in garden lands, where the chuckler employed to stitch the leather buckets, is provided with a hut for himself and his family.

A point worthy of investigation is the advisability of giving occasional rest to the labourer doing strenuous work. The writer remembers reading of some American Experiments with a similar view but has not heard of any such efforts made in India. During the first half an hour that a ploughman works, the efficiency is low owing to several defects connected with his plough, his oxen or himself. When adjusted, however, during the next hour, the efficiency is

umber of hours worked, which is due to the sual human as well as animal weekness. f, however, from the time that efficiency ends to show retardation, some rest is afford-ed, it is worth investigating whether effici-ency cannot be maintained at a higher level than if the labourer is worked in the usual way. It appeals to common sense that efficiency is bound to increase, but there are practical difficulties in the way. Unless supervision is perfect, the labourer is likely to take undue advantage of the relaxation. In the case of operations done as piece work or under share system, the labourer solves the problem himself by taking rest whenever he feels the necessity, and while engaging labourers in such operations, it would be most useful to study unnoticed, the method of relaxation and the frequency of it, that the piece worker or sharer enjoys. Closely allied to this is the periodical rest that the animal system needs in maintaining the body in health. Nature is an efficient master and revolts when bodily rest is suppressed. How often and for what length of time, such periodical rests be encouraged is a matter to be decided purely by local conditions. The rest given to the labourer must be at the expense of the employer alone. In western countries except for a brief annual holiday, the workman is compelled to lose his wages for all compulsory holidays. This, however, cannot be done in India, where wages as we have already seen are low. It is suggested that all employers should insist on their servants taking a holiday even once a fort-night at full pay, as it is indeed a short-sight-ed policy to make a labourer work week in and week out without any change or relaxa-tion. Custom demands of the employers of domestic servants in England the giving of a weekly and sometimes a bi-weekly half holiday. In Government farms in this presi-dency, all farm labourers are given three holidays in a month which they can accumu- [...] ...sighted

It may be a good plan also to seduce or increase the hours of work according as the season is dull or heavy, instead of adopting the hard and fast rule of 8 or 9 hours a day of work. In summer when the days are hot and long, it would contribute to efficiency if labour is employed only during the cool hours of the morning and the evening, with a long break in the afternoon.

Since it is recognized on all hands that agricultural labour is monotonous, it should be one's endeavour to change the occupation as far as possible. It may not always be possible,—indeed it is not considered expedi-ent, to change the occupation during a day, but it ought to be possible during a week. A ploughman to be made to plough day after day, is irksome both to man and beast. A change to harrowing or carting would be a welcome relief.

Competitions have their great advantage in increasing the quantity of work turned out, but must not be allowed at the expense of quality. A better method than competi-tion seems to be an award of surprise prizes in money or kind, for good work turned out by the labourer without previous intimation. This will create a healthy rivalry among labourers tending to keep efficiency always at a high water mark.

It is very unfortunate that human nature likes to keep people below ourselves, in the same level at which we found them. I would think that discouragement and dis-satisfaction at their own state are the root causes of a good deal of inefficiency among labourers. Such employers who would en-courage and help to lift their labourers from their serfdom to those of independent landed proprietors are considered real benefactors to the nation.

The writer has endeavoured to briefly record what he had learnt from his experi-ence. He is aware that there are many whose experience is much more mature and varied, who he hopes will throw more light on this problem. That practically little or no investigation has been made up to the present is evident and it is a pity that a pro- [...] ...scienti

CO-OPERATION IN BIHAR AND ORISSA, 1918-19.

BY "RUSTICUS."

THE last Report of Khan Bahadur Mohi-ud-din Ahmad, the Registrar of Co-operative Societies in Bihar and Orissa, is one of the most interesting we have read. The Khan Bahadur is an enthusiastic believer in the future of co-operation in his province but he does not gloss over the weak points in the movement. He is on the spot and should know best but many of his readers will wonder whether he is not unduly optimistic. They need not go farther than page 4 of the report to find facts in support of their view. The Provincial Bank has a sum of nearly Rs. 4 lakhs on fixed deposit. Of this, Biharis have contributed Rs. 20,000 only. The Madhipura Central Bank has deposits of Rs. 83,000 of which "true sons of Bihar" have contributed Rs. 37, the rest being from Bengalees and Europeans. Again, with hardly an exception, it would seem that nothing would have been done in the new areas which were opened up during the year had it not been for official assistance. It is in every way most desirable that District Officers should take the keenest interest in co-operation. There is no way better calculated to bring them into touch with the soul of the people. But it is not as it should be that so much of the initiative in starting co-operative institutions should rest with them.

In 1918-19, the number of societies in Bihar and Orissa increased by 468 to 2,169. The number of members rose to 83,029, an increase of 8,158 and the working capital to nearly Rs. 65 lakhs, an increase of rather more than 10 lakhs. All but 150 of the societies are agricultural societies. 1918 was a bad year agriculturally for Bihar and the Registrar considers that, in the circumstances, a realization of 50 per cent of the demand of the agricultural societies which was the same figure as in the preceding year was extremely satisfactory. He adds that even this percentage was only possible on account of the very high prices obtained by members of societies in areas in which the crops did not fail altogether. We are unable to share his satisfaction. If year after year, societies are only able to realize about half their dues, they will soon find themselves bankrupt. But it would not be fair to pass too severe a criticism on the results obtained in what was undoubtedly a bad year and we shall await with interest the Report for 1919-20 which was *not* a bad year and shall then be in a position to judge whether the movement in Bihar is inherently sound. There is certainly one point which must be accounted to the Registrar for righteousness. Loans for which extensions have been granted are not excluded from the amount shown as overdue. As Mr. Mohi-ud-din Ahmad says, this procedure gives a better idea of the actual inability of the societies to pay on the due dates and leads to closer scrutiny of the causes why loans are not repaid. But technically speaking, loans for which extensions have been granted are not overdue and had the Registrar been given to the pernicious practice of "window dressing", he would have excluded them.

Before leaving agricultural co-operation, mention should be made of the loss co-operation in Bihar and Orissa has sustained by the death of Father Molhant of the Catholic Mission at Ranchi. The Catholic Mission Society which he founded is stated by the Registrar to be the largest co-operative society in India. This may be true of its membership which is nearly 12,000 but is not true of its operations. It has a working capital of Rs. 4·3 lakhs which is only about one quarter of that of the G. I. P. Railway Employees' Society in Bombay. This, however, is merely by the way and in no way detracts from the excellence of Father Molhant's work. His society rendered most

valuable assistance in recruiting men for labour corps and he kept a paternal eye both on those who went and those who were left behind. Those who weot received only a small part of their pay, the balance being banked for them until they returned. When they came back, most of them found that they had enough to redeem their mortgaged holdings and to free them from debts. Many of them were able to purchase more land and cattle. A tribute to Father Molhant's memory might well have been included in the Local Government's review of the Report. If there were more co-operators like him, the problem of the indebtedness of the Indian peasantry would be in a fair way to solution.

The number of non-agricultural credit societies increased from 41 to 61 of which 25 are for Government servants. The best of these is the Secretariat Co-operative Society which has 398 members and a working capital of Rs. 45,000. There is a very human touch in this section of the Report. In referring to the work of the Provincial Civil Service Co-operative Association, Khan Bahadur Mohi-ud-din Ahmad mentions that the Provident Fund contribution amounts to Rs. 5,450 and that deposits are not coming in. He adds, evidently from the depths of his own bitter experience as a member of the Service for whose benefit the society was formed that this is not to be wondered at as very few officers are able to save anything.

There can be no doubt, that, as time goes on, the test of the progress of the co-operative movement in India which will be increasingly applied* will be the progress in what are now lumped together as other forms of co-operation. It is a test which, if applied at present would give most disappointing results. Bihar and Orissa is not the worst province in this respect but that is all that can be said. The number of stores increased from 6 to 12. The increase was due to the prevailing high prices but the Registrar adds succeeded in creating much enthusiasm amongst their members as their successful management is by no means easy. That is the crux. The honorary worker or even the paid manager has to compete against the shrewd bania or marwari who has spent a lifetime in close touch with the market and knows exactly when and where to buy. However the Secretariat Stores are prospering and are erecting a house of their own at Patna at a cost of Rs. 6,000.

As our readers are aware, we are not hopeful of the efforts the Co-operative Department is making to improve the lot of the weavers. In our view it is merely bolstering up a dying industry. It is true that its death will be lingering and that for a long time to come the conservatism of large sections of the Indian population will preserve a market for the products of hand looms. We need hardly add that we should be very glad if one gloomy ratiocination on this point were falsified. There are 19 Weavers' Societies in Bihar and Orissa and the Registrar gives a glowing picture of improvement co-operation has effected in the condition of two of them, the members of which weave tassar silk. Before these societies were started, the weavers had to go 20 miles to get their supyly of cocoons and to sell their cloth. Now they buy a whole year's supply of cocoons at once and the traders have to come to them for cloth at their price. They used to be in rags whereas now they earn Rs. 1-8-0 a day and some of them have begun to build brick houses. Information about the other weavers' societies is somewhat scanty. It is not stated how many of them weave silk and how many cotton cloth. The Ranchi Weavers Stores had a satisfactory year and made a profit of nearly Rs. 4,000. This seems to have been largely due to orders received from the Munitions Board and it is to be hoped that the society will continue to flourish in more normal times. It will have to improve its business

says that its account keeping was very defective and that too much latitude was allowed to people who failed to keep their terms.

We regret to notice that the Co-operative Agricultural Associations from which much was hoped have proved a great disappointment. These Associations were formed with the object of arranging for the supply of seeds, manures and implements to their members, of undertaking the sale of the members' products in bulk and of entering into any other business calculated to assist their members in the cultivation of their land. Not one of the Associations has, however, been able to achieve all three of these objects. The Nawada Society confined its attention to obtaining and distributing Pusa wheat but its work in that direction is now over as cultivators can get seed either in their own villages or in others close by. The Bihar Society made some profit on the sale of manure but failed ignominiously in its efforts to sell the potatoes grown by its members in Calcutta. The Barh Society distributed a little seed and then collapsed. The Fatwa Stores still struggles on and some members who stocked their grain with it in March and sold it in October got nearly half as much again by doing so. But, as the Registrar points out, it has to be decided whether societies of this class should purchase their members' products outright or merely act as commission agents. If they decide on the latter course, will it be possible to ticket every member's produce and to sell it when he thinks best? And if the stores are asked to supply say 1,000 maunds of grain which is actually in stock and the members refuse to part with more than 300 maunds at the price offered, will this tend to further business? Khan Bahadur Mohi-ud-din Ahmad says that the first condition of success for societies of this character is that they should have managers with sufficient specialized experience of the nature required cient number of agriculturists should be willing to raise a substantial share capital and to provide the store with enough business to enable it to pay a good manager. Unfortunately these conditions are more easily laid down than fulfilled. The Registrar adds that it is necessary that the Agricultural Department should help these societies in all their activities and that the time has come when every Central Bank which is established on a sound basis can provide sufficient scope for the activities of a whole-time officer of the rank of an Inspector of Agriculture. As Mr. Noyce pointed out recently in the valuable volume of Co-operative studies edited by Mr. Ewbank and published by the Oxford University Press, which we commend to the notice of our readers, close touch between the Agricultural and Co-operative Departments is very desirable and indeed essential but it is not sufficient. "Agricultural trading societies" (as he calls them) cannot be expected to thrive unless they are treated as an entirely distinct branch of the co-operative movement. The ordinary staff of the Co-operative Department has its hands too full with credit societies to give them the attention they require. They must have their own whole-time organizers and experts and these must be allowed a free hand and must not be bound by rigid rules and restrictions.

We have already mentioned that Khan Bahadur Mohi-ud-din Ahmad is an optimist. In no respect is his robust optimism more clearly shown than in his vision of co-operative mills. As soon as the new Department of Industries in the Province gets going and he is able to count on expert advice and assistance in the matter of machinery, he hopes to make these mills an accomplished fact. He considers that they are certain of success, in the first place because there is an unlimited demand for their products which would be oil, ground wheat, husked paddy

place, because they would have the advantage of securing all the raw material they require without the trouble and expense of collecting it through middlemen. The Registrar realizes that if such mills are to have any prospect of success, they must be run from the beginning on proper business lines but he does not say where business men are to come from to run them and whether it will be possible to get them on the scale of salaries co-operative societies would be able to pay. The failure of the Agricultural Associations is not of good augury for the success of the far more ambitious project of running co-operative mills. We earnestly trust that the Registrar and the Local Government will go slow in this matter as the failure of an ambitious scheme would certainly cause irreparable harm to the whole co-operative movement in India.

As regards supervision, the system of guaranteeing Unions is making progress in Bihar and Orissa. The number of such Unions doubled during the year and is now 42. It would have been interesting to know how many societies are affiliated to them. It is, however, clear from the Registrar's remarks and indeed from the principle which has led to the establishment of these Unions which is that each society which belongs to them should have an intimate knowledge of the affairs of its fellow members that the number cannot be large and that there is plenty of room for the establishment of more Unions.

The great event of the co-operative year in Bihar and Orissa was the establishment of Co-operative Federation. Nearly 1,800 societies were affiliated to it during the year and most of the remaining societies have joined since the close of the year. No new society is now registered which does not accept affiliation. The Federation seems in a fair way to solve the vexed question of the cost of audit in a manner satisfactory to co-operative societies and to Government. The arrangement is that Government should bear the entire cost of the audit of new societies and of societies situated in backward areas, should make an initial grant of Rs. 15,000 to the Federation in the first year, should contribute one quarter of the cost of audit of societies of more than two years' standing and should present each new society with a set of registers free untill the Federation undertakes its own printing when the latter will be given a further grant for the purpose. At the last meeting of the Council of the Federation, it was decided to appoint two Boards one for Bihar and Chota Nagpur and one for Orissa. The object of these Boards is to enable local co-operators to meet more often at convenient centres in order to discuss lines of development which they would like their representatives to press at the annual Congress meeting of the whole Federation. The establishment of the Co-operative Federation means that the co-operative movement in Bihar and Orissa has been given a very large measure of self-government and that the Registrar will more and more become an adviser rathed than a ruler. All co-operators will hope that the powers thus given will be worthily exercised.

According to an official report published in Washington, Germany to regain foreign trade and realise large sums on manufactures that otherwise must remain unsold on account of foreign prejudice, is dumping surplus inferior goods on Britain and the United States. The exports to Britain, according to this report, are marked " Made in America " and those to the United States, " Made in England." Such tactics, the report says, discredit American manufacturers in Britain and British manufacturers in the United States.

SECONDARY EDUCATION IN MYSORE.

By "Lynx."

I have much pleasure to comply with the request of the Editor of this *Journal*, that I might write him a short paper on Secondary Education in Mysore, and that I might utilise for this purpose the deliberations of the recent conference of the Head Masters and Inspectors, held at Bangalore. Unfortunately they were confidential and one is left togather the drift of the discussions and the nature of the programme from the speeches of the presiding authorities and the very meagre information regarding the opinions of others published in the press. The principal part of the programme which received the attention of the Conference, seems to have dealt with subjects like the abolition of the Lower Secondary Examination, the Consolidation of facilities for the Education of the depressed classes and the extension of the Provident fund scheme to the aided and private schools. Practically nothing of any useful kind of discussion, seems to have taken place on the subject of Secondary Education and the only justification for writing now a theme on it is the publication by the Government of two important Educational documents *viz.*, the minute by the Inspector-General of Education on the improvement of Education in Mysore and secondly the Government memorandum on the same subject. I am not very keen on saying anything on these publications, though they have now been in print for the last one year, but must observe that the field of Education would have been surveyed from a different angle of view, had the authors of the latter work been conversant with the theory and practice of Education. I would rather proceed to record my own views concerning the one, perhaps the most important department of Education *viz.*, Second-

I had always adhered to the view that a sound and efficient Elementary and Secondary Education is the most urgent among the Educational requirements of Mysore and the University Education is something in the nature of an expensive luxury and only those whose intellectual equipment warrants need indulge in it. There can be no difference of opinion that the condition of our Secondary Education is most certainly poor. The different grades of instruction are so linked up with one another that it is idle to talk about the efficiency of any one particular type without reference to the condition of the one the immediately below it. The University is receiving year after year half-baked material and this is simply due to the fact that the Secondary schools admit pupils who are most insufficiently prepared for the methods and standards of secondary education. I do not mean to suggest that the material is at all inherently bad, but it has been mishandled at every stage and consequently requires a long preliminary training before it could be fitted to the new methods and where such a preliminary training cannot be afforded, the results of work must be unsatisfactory in the extreme. I have had opportunities of visiting some of the elementary schools both in the mofussil and in the towns, while in session and nothing useful will be served by expressing my opinion about their condition and work. Every one will advocate that the most urgent need is a thorough-going reform of Primary Schools, but few will really come forward with any practical programme. At the end of the training in our "Lower Secondary" schools, the pupils whose average age is about thirteen, must have been taught to observe accurately, to reason logically and to write out their observations in correct, simple prose. I am not here concerned about the medium of instruction, though a great deal of importance is placed on the subject by some Educational thinkers, for the thing that really matters is the energy and the character of instruction.

f "Lower Secondary" instruction would ppear ridiculously simple but it is unortunate, however, that even at the end of igher secondary instruction, those qualities re still subconscious. Aptitude for observng things, though following the lines of iatural bent in children, has to be trained to liscriminating use and powers of reflexion ind expression so indispensable to the growth of intellect have to be sedulously fostered. You can define the end much sooner than lay down the means for its attainment, and they comprise an adequate provision of trained staff, correctly written books, buildings and equipment. As regards the Lower Secondary grade, the latter two are not formidable problems, for remember that some of the most eminent educational reformers have got on wonderfully well without any apparatus or teaching material expect those improvised by themselves. If a teacher has not skill enough or that mental alertness to use pebbles in teaching arithmetical calculations to the children in the Infant class or to use a map of India drawn by himself to teach Commercial Geography, in the third form you may be certain that an Abacus and Johnstone's sheets are dead matter to him. I would honour the teacher who has sense enough to propose to his class "well, children, come let us go out and pick a few pebbles each," and uses the occasion for counting, "How many have you got, and you," and so forth and incidently teach something regarding the shape, feel, colour and other properties of pebbles. The gain on the intellectual side, is a very successful lesson taught and on the moral side, the pupils will have, under skilled guidance, gained the steadying influence of cheerful discipline. My heart is filled with anguish when I see on the mud walls of our elementary schools, coloured prints of foriegn animals and plants which form the staple of instruction in them. How can teaching be real, and where is enthusiasm. It is absolute waste of money to buy such ... which however should be the handiwork of teachers and pupils, during the progress of the lesson and particularly good productions should have the honour of adorning the walls of the class room. They will then discover a tongue and deliver their message of hope and promise to the succeeding generation of scholars. Education is really *doing* and *reflecting*. How can you have really good and national Education where the teachers wish to use finished and artistic product of foreign make and hold forth in a solemn manner, generally imperfectly, on the philosophy of things? How can the teacher secure the attention of the children which is most fugitive, except by a birch? I call this miseducation,—a set lesson on objects and things in the making of which neither the teacher nor the pupils have participated. Imagine on the other hand a teacher dividing up his class into small blocks after a few preliminary instructions, and assigning to each "block," a small lump of clay obtained from the neighbouring tank, and proceeding by deft and repeated supervision, to obtain from the "blocks" of pupils relief maps of India, in illustration of cultivation, rain fall, water course, commerce and every other aspect of Indian Geography. Similarly History, Nature knowledge and Elementary Science. "Doing" like this secures for your Education elements of truthfulness and honesty which are also elements of Religion and Morals and your Education is mis-education because these elements are divorced from their proper place and attempted to be taught as separate lessons. Remember that creed and dogma taught through set lessons from books are the parent of cant and sham so fatal to all good education and no one is more shrewd than children to see that what is taught in the Sanathana Dharma is a trifle different from the practical exercises in the class room, if such exist. Your Education again is mis-Education because there is not much "*doing of things*" where children learn that value of corporate action and develop that sense of mutual responsibility

which are the foundations of good citizenship. On the other hand we rely too much on the force of set lessons to instil into the youthful minds these doctrines and like most other lessons given straight from books, they are forgotten after the hour is done. Take up the time-table sheet of any Elementary or Lower Secondary School and you find indicated on it so many periods of every day set apart for instruction in Religion, Morals, Citizenship and such other good things but all too incomprehensible to children of all sizes and growths. The inference that the children draw from such a time-table is that at other periods of school work you can afford to be irreligious and immoral. What is character if it is not the determination to be good, and straightforward in ones work and how far have you succeeded in building up the character of your boys, by discoursing to them weekly or daily lessons on the exploits of a dead hero. No, you have to come back to the old conception of Education that it is a life-process; it consists in "*doing*", this "doing" is acceptable only if it is true and honest; the more true and honest this "doing" the higher is the exaltation of life. This is the Philosophy of our Elementary and Lower Secondary Education and though the process may be somewhat slow—which is bound to be in the hands of the unskilled teaching agency,—the foundations are absolutely sound. The superstructure will rise with rapidity thereafter.

Any person not endowed with sufficient courage of that statesmanship and administrative skill which come from knowledge,—may be disposed to think that the above is a bundle of counsels of perfection and are outside the beat of practical politics. There is hope in the Present Inspector-General of Education who combines both courage and knowledge in a very judicious mixture indeed. The ideal of Elementary and Lower Secondary Education such as a parent like me would wish to see developed in his children simple factors *viz*, ability to observe, ability to reason and ability to write. The method of intruction at this stage is "Learn by doing" and *not* "Learn by hearing." The equipment for such instruction would include rooms with simple and comfortable forms, a generous supply of *raw* materials and implements for all the different processes of "*doing*". The addition of coloured charts, models and such other expensive uneducational appliances may give to institutions of this grade an air of up-to-dateness but are by no means a guarantee of efficiency and right course of instruction. Give me the right kind of teacher and I guarantee you will have hundreds of these teaching appliances which may be crude but of the utmost Educational value,—prepared by himself and his pupils. Witness the exhibits in the Educational Museum at Bangalore, which are the handiwork of English children and masters of the Elementary grade. It is apalling that none of the thousand and odd schools in Mysore has contributed a single exhibit, of any kind, either by the scholar or by the teacher. An Educational Museum is at once a temporary and growing institution, but that at Bangalore, is very static indeed. It is this sort of education as is manifested by the English Exhibits that our children should receive in our Primary and Lower Secondary grades and if it is not insisted upon by the Inspecting Agency, then all the time and money spent in erecting the museum are a waste and you cannot persuade the parents to believe that all is well with their children's education. Well it is true that the children get the education that the parents deserve and these parents even in the piping times of peace take no more notice of their education than payment of fees and despatch of a recommendatory note to the master if the boys are not promoted. In one of his contributions on the Educational subjects which he wrote in 1914, the present writer advocated the formation of District and Taluk Boards

Secondary Education as a means of bringing the apathetic parents and general public into living touch with their boy's education and compulsory periodical supervision of these schools either independently or along with the Inspceting staff on the part of the Board Members was suggested as a means of developing the appetite of the parent for abundance of good education for his boys. The present writer is gratified that the Madras Elementary Education Bill has adopted this measure of forming District Boards and he hopes that they will be worked in the right spirit free from communal bias.

I now come to the Higher Secondary Education which extends over the most critical period in the intellectual development of the youth. The secondary institutions are a workshop or a factory in which the principal share-holders are the Government and not the private agencies. The investment of money in these Schools and Colleges enables the Government to command a supply of trained minds and resourceful inventiveness in the output to be utilised in the different branches of administrative machinery. A far-sighted parent ought to demand a higher standard of training for his children in these schools, in view of the economic stress and competition, and would insist on the Government providing a wider scope of opportunities for receiving that kind of secondary education for which his boys are best fitted. It is not yet time in India for the Government to withdraw from the field of education in any grade, for the Indian community has not yet established any very large industrial and commercial organizations of their own for the absorption of the secondary grade men and graduates. That day is yet far off and when it arrives, the Government ought to be able to hand over to its people really high class institutions. If the Government recognize that its greatest foe is not the agitator, but the ignorance of its people then it has to put into the fight all reserve this doctrine to be trotted out on occasions of platform oratory.

First class buildings and complete equipment of them will not assure efficiency of School instruction, though they are not to be despised. The presuppositions of education are the teacher, the pupil and the materials of teachings. There is nothing bad about the latter two, though I would say that our schools are far behind anything like reasonable equipment. What the Government,—I am not concerned here with the aided agencies which do not enter into my scheme of ideas,—have done is this. They have put some people—though there are honourable exceptions in charge of these schools, to whom teaching is a trade,—quite a temporary expedient of that. You do not put a ship in charge of a Captain who knows nothing about the compass and the barometer for here the catastrophe which will overtake such a policy is most demonstrative. We don't hesitate to put a teacher in charge of a school, who is as ignorant of the child mind as his own and we never bother about the ruin that befalls the mind. As the process of imitation is silent and slow,—hence all the more sure,—we take no trouble to watch it. The problem of the teaching staff is most interesting. He sees that others engaged in the different functions of administration are well off and naturally compares the situations—when he asks for promotion and betterment of his prospects, he is told, "nowhere in the world is a teacher paid the salary due to the civilians." Whoever may say it, he must admit that he has no right to expect work on the part of the teacher comparable with that of the civilian. The answer I have put under quotation marks argues rank ignorance and the sayer of it could not have seen much of the world. Take any country where education is worth mentioning. In Germany there is only one civil service, and Education is the first department in it; the teachers and professors receive salaries not one whit below what is open to the highest civilian

and their wives are entitled to pensions. But Germany does not employ in her educational service, as in other departments, men who do not know their job, and those that enter it have no counter attractions. Consequently the progress of knowledge in German Schools and Colleges was an unbroken line and the bulk of them are Government institutions. In India, we have admitted into service cheap men and the authorities are not in a position to say to them, "No, this I consider is your wages and if you are not satisfied you may go," for they cannot attract better men. The teacher problem is not a formidable one. You have got to recognize only one service in the state and it matters very little where you put the teaching profession, so long as you do not introduce different scales of pay and promotions should run on parallel lines. The teachers in the Elementary Schools, who *ought to be graduates holding professional diplomas* and none else, should be permitted to rise to the minimum salary of the Assistant Commissioners and those in the High Schools *who ought to be honours men with higher professional training* should be permitted to rise to the minimum salary of the Senior Assistant Commissioners. No body need think that these are moon-shine proposals, though it is true that Government will turn up their noses at them. But if we are not prepared to pay a higher rate to our masters who have got to "mould the character and shape the minds of our future Dewans and administrators," what is your justification for paying increased rates of salaries and perquisites into the bargain to the officers who deal with dead writing and paper If you adjudicate rates of pay in proportion to responsibility of work then you should immediately reverse the scales of salaries in favour of the teachers, for which is more difficult, to be in charge of the mind of the future citizens and administrators or to be in charge of written manuscripts. It is not difficult to conceive the mode and direction of the formation of the intellect and character of our potential Dewans and merchant magnates, not omitting other bigger citizens and administrators, ranged on forms without backs, in charge of a school master into whose soul the iron had already entered and whose daily wages for fashioning greatness in men, is annas eight, only $\frac{1}{40}$ of the daily earnings of the Coal miners in England who have struck because the authorities would not summarily add another two shillings (equivaleut to four day's wages of our teacher) to their daily receipts. There is already the growing feeling that the schools are the refuges of the rejects and if we help in the accentuation of that feeling, the smash will come, not certainly at once, but in its time and when it comes it will be overwhelm us. Of course we may not be immediately affected, but if we ignore the demands of the generation still in the making, we are false stewards of the interests of the present. You may construct the finest buildings, equip them with all the new fangled appliances, frame an artistically perfect scheme of studies, but if there is not the mind that is cheerfully content with the prospects of promotion and situation to work them all these are dead waste; perhaps the only result is the production of a generation of young men filled with the most pessimistic doctrines of human life and conduct. These young men are our future rulers. Let me leave the problem at that.

The ideal of the High School instruction ought to be to provide the boys who seek its benefits, with a strongly developed average intellectual strength, enabling them either to enter upon a course of preliminary training for the University Education, or to enter upon a course of any professional training. The unsatisfactory features of our High Schools are the size and composition of the classes, the accommodation and equipment and finally the curriculum of studies. The Sadler Commission has recorded some very excellent proposals for the reform of Secondary Education and their recommendations

naturally partake the character of English public schools; though some of them are sound, it would be unwise to adopt them wholesale in a small state like Mysore where conditions and needs are not entirely identical with those of the neighbouring provinces. The total admissions into the IV Form, the lowest class in the High School heirarchy, in any year represent about 75 per cent of the strength of III Form and when the Lower Secondary Public Examination is abolished the admissions may be larger. To me it appears that this is a serious matter to the High Schools, which have to find increased accommodation and appliances which are always slow in coming, to say nothing about the staff. The old matriculation system was devised to serve a smaller number for the University and administration needs and the system became an anochronism for several reasons. In the first instance the classes became hopelessly large as the direct result of the expansion of the desire among the community for more Secondary Education. The composition of the classes, was not favourable for producing good results through common instruction and the outlook of High School students never extended beyond the University and cheap careers, nor was it favourable for the adoption of any improved methods of instruction. The students coming from the slower grades were already badly handled and this process was continued throughout their secondary course, with the consequential numerous failures at the Matriculation Examination. The S.S.L.C. that has been substituted is worse and is a feeble imitation of the courses of studies adopted in the English Public Schools. Let us remember that the average age of the High School youth in South India in the Mysore is 17 and I should consider it unwise at this stage of the mental development of the boys, that the classes should be split up into separate blocks for intensive work in subjects like Mathematics, Physical and Natural Sciences [illegible] Add to this the pressure of weekly examinations and markings in the certificate, and you have absolutely no Education, but all else. The S. S. L. C. must go, before you can think of any rational reform of Secondary Education and indeed it is impossible for me to conceive how you can have a sound university education with the S. S. L. C. still existing. It is equally impossible for me to conceive how you can found a University, without a preliminary reform of the Secondary Schools and bring them up to the level of the University needs on the one hand and on the other the needs of the Government and the community which absorbs our output from the High Schools.

In planning a course of studies for the High School one cannot afford to forget the average of the youths and the previous training they have received. I assume for the purpose of this paper, that at the base we have a well staffed Lower Secondary School which passes its pupils who have reached the ideal of the Lower Secondary instruction, which I have set forth above, to the High School. Any body who is acquainted with the elements of Psychology will tell that it is inexpedient to devise specialised courses for youths between the ages of fourteen and seventeen. On the other hand the mind is most sensitive to impressions of many kinds of knowledge and is fit for laying the foundations of general culture without which specialization is spurious. The intellect of boys at that age has a many-sided interest and has a more or less omnivorous appetite on whose judicious gratification lies the ordered progress of instruction. The intellectual occupations ought to enlighten and practise the conscience where as many windows as are already present, should be fully thrown open and new ones established. I do not believe that at this stage it is expedient to devise a course for varieties of individual aptitude at which the S. S. L. C. course plays, for the simple reason that the mind is not yet individualised in intellectual interests Remember that our S. S. L. C. system is a

feeble echo of the Secondary School course before 1809—25, and our old matriculation corresponds to the modren German High Schools. The Germans believe that the thing that matters most at this stage is the im. portance of securing a high level of average intellectual competence, without regard to individual aptitudes which should develop in the Intermediate grade. Our old matriculation system failed for two reasons. Firstly because we simply carried over to the High Schools the methods of instruction persued in the Lower Secondary grade, *viz.*, of teaching the class as a unit for all subjects, and secondly because our staffing was both inefficient and inadequate, apart from the size and composition of the class. The Germans have been able to maintain an excellent standard in their High Schools because they have provided a skilled and most intensely trained staff and you do not see any defects in the system which was undermined in South India. The remedy was not the substitution of a system given up in Germany and practised in England whose conditions are entirely different from our own. "The New and more individualising method came into English Higher Secondary Education during the second phase of the Industrial revolution, and the change reflects the regard for individual effort which was common to much of the English thought at the time." There has been no revolution in India of any kind and magnitude and yet we have thrown out our well tried matriculation system and adopted the S. S. L. C. course. We are children in education as in most other matters and novelty pleases us and we mistake it for originality. But what was the older English method. It was the preseut day German system. Any new system is bound to fail if it is not supported by public demand and there was absolutely no demand from any quarter for this S. S. L. C. system. We are keeping on to it, lest we should be laughed at for readopting the old method.

The defects I have noticed above regarding the old High School system—which is synonymous in our minds with matriculation, but we shall give up now the term because the High Schools I have sketched here and are recommended by the Sadler Commission are not the training ground for admission to the University,—could have been remedied by a slight readjustment of studies and better staffing. Let me repeat here that without a very highly trained skill in teaching, all plans, however carefully designed, are bound to fail and the blame does not attach to the system, but the agency which employs teachers. The object of the High School teaching being a general culture in the individual and a high level of average intellectual competence in the boys, I proceed to lay down the following curriculum of studies as best suited for the attainment of the end. I assign to the vernaculars the same position as English in regard to teaching methods and general attainments. There are six compulsory subjects and the courses sketched out are to be covered in three years.

1. English. (*a*) Prose.—600 pages of *modern* prose, chiefly dealing with stories, novel, adventures and scientific discoveries and inventions.

   (*b*) Poetry.—600 lines of modern narrative poetry.

   (*c*) Composition.—The class is to be divided into blocks of manageable size for individual attention. Composition classes may vary with conversational classes in which powers of expression in correct simple English will be encouraged. On the time-table, I would show two hours for prose, two for poetry, and three for composition or conversational classes.

2. Vernaculars or a Classical Language 6 hours.—Same as above. Substitute translation for Composition in the case of classical language.
3. Mathematics, 3 hours—one hour per week per subject. —(*a*) Practical Geometry including Mensuration and Surveying.
   (*b*) Algebra.
   (c) Arithmetic.
4. Natural Science: (*a*) Physics, (*b*) Chemistry, (*c*) Human Physiology: three hours per week; the subjects should be treated practically with plenty of demonstrations by the teacher. Special references to Hygiene are to be made in the Physiology course.
5. History: (*a*) Indian, (*b*) English, mainly the history of the people and their institutions, 2 hours in the week.
6. Geography: (*a*) India, (*b*) General, including, physical, commercial and Industrial aspects of the subject, 2 hours in the week.

Non-examinational Compulsory subjects.

1. Manual occupations like Sloyd-2 hours.
2. Art work. Drawing and painting—2 hours.
3. Physical Exercises.—1 hour.

Optional subjects with optional examinations.

1. English, or any European language.
2. A Second Vernacular or Classical language.
3. One of the mathematical subjects.
4. One of the Natural Sciences including Biological subjects.
5. History of India or History of the British Empire.
6. Advanced branches of Geography.

Instructional and tutorial guidance will have to be provided in the above subjects outside the class hours for such students whose special talents and intellectual predilictions might lead them early to take additional course in them. With a view to enable them to obtain a distinctive certificate, the students in these optional groups ought to be permitted to take an examination in them. The institution of such optional courses certainly favours individuality and the growth of centres of intellectual interests in the more intelligent scholars. I have not included in the optional category any of the technological and professional subjects, which according to my conception of the aim of High Schools, lie outside the main trunk and begin after it is done.

I am aware that the Sadler Commission recommends only four compulsory subjects *viz.* Vernacular, English, Elementary mathematics, and Geography and the candidate is to bring up for examination one other out of a list comprising classical language, an approved scientific subject, additional mathematics and History of India. It is open to doubt if the curriculum so constructed would lead to the attainment of the end of the higher Secondary Education as defined by the Commission *viz.*, a preparation for life, but also specific in its preparation both for the University and immediate entrance upon other careers. It is certainly not an improvement on the old High School Syllabus and is not more liberal than the Mysore S. S. L. C. Course. Dr. Gregory has expressed himself in his minute warmly over the omission of Science from the Compulsory list and it is decidedly a better subject than Geography from the educational point of view. A non-compulsory subject is usually the non-taught subject also in our Secondary Schools and a certificate as to its being taught is not a trustworthy credential at all. From a cultural point of view, the curriculum laid down by the Commission is very defective indeed for drilling Science and histories on the Compulsory list and affords a most insufficient preparation for the University course. At the recent Conference of Head-masters held at Madras, the discussion on the S. S. L. C. subjects as reported in the press, seems to have demanded the inclusion of more technological

optional subjects. This will not prepare the pupils for the subordinate careers in the workshops and factories such as we have at present but the cost of providing the necessary equipment for such technological training will chill the enthusiasm of the controlling agencies. But my own feeling is that at the first blush of novelty, the pupils are likely to rush and discover the mistake of their choise when it is late. As I have said already that in any new scheme of studies that we may frame, we cannot altogether afford to forget the age and the psychological bearings of the mind at that age of the pupils to whom they are intended. We are somewhat proceeding on the old empirical lines of either going on adding to the list, some one or other subject to make the thing attractive or drop it without ceremony if it does not prove its popularity, but rarely do we think about the age of the pupils and the methods of instruction which really matter.

As a parent to whom a sound all-round Secondary Education of his boys is an asset, I should insist on the following.—

I. Only the very best staff that may be secured by the scale of pay Rs. 200-25-400, efficiency bar, Rs. 400-25-600, should be employed in the High Schools. Any other pay will only attract the wash-outs and the children's education becomes a long process of miseducation. If the Government think that the money they put on their teachers will bring back to them a return in hundred fold in the shape of a splendidly-trained generation of youth who will carry forward their administrative schemes and not corrupt them, then let there be no stinting. The efficiency bar in the case of these secondary teachers, would be their contribution to the subject which they profess and the Educational theories which they practise. While on this subject, let me state how the cordiality of feelings between the Head-masters and their assistants—which has been unfortunately one of the topics of discussion at the Madras Conference. could be improved. The Head-master is only a senior assistant and should not be in any way different either in point of pay or position and for the performance of additional administrative duties, a special charge allowance should be attached to the incumbency. I would go a step further and suggest that the head-mastership should go round the more competent of the senior assistants in rotation, and every such assistant will have the chance of giving the Institution the benefit of his administrative skill and the practice of his Educational ideals. I cannot conceive of a better plan for the promotion of a spirit of close comradeship and a zealous devotion to common ends, among the assistants and for the removal of the galling sense of subordination with its attendent exclusiveness and jealousy.

II. I believe that the abolition of the S. S. L. C. and the substitution in its place of the old High School curriculum with such alterations as are indicated below is what the student between the ages of fourteen and seventeen needs.

A. Compulsory Subjects with an Examination.

Subjects.		Class IV		Class V	Class VI
English	Prose ...	2	7 hours per week	Same as in the IV class.	
	Poetry ...	2			
	Composition or Conversation.	3			
Vernacular.	Do.	6			
Mathematics	Geometry,	1	3		
	Algebra,	1			
	Arithmetic.	1			
Natural Science.	Physics	1	3		
	Chemistry	1			
	Physiology	1			
History	Indian	1	2 hours per week.	Same as in the IV class.	
	English	1			
Geography	Indian	1	2 ,,		
	General	1			
Total Subjects 6.		23 ,,		23	23

The remaining five working hours will be utilised for the Compulsory non-Examinational subjects like art-work, manual occupations and so forth. My main object in alloting 3 hours per week to composition and conversation is obvious. Given the very best staff, the methods of instruction will be most appropriate though I would watch their progress and maintenance of high standard through the Inspecting agency. I need not dwell on the methods of Instruction but shall proceed to say a few words on Examinations. We cannot entirely do away with examinations, but we can mitigate their terrors and make them look quite as part of the legitimate work of the student. According to my plan, the average student will bring up only the above six subjects and the forward boy another additional optional subject for the final High School Examination. In the fourth and the fifth classes, the class examination should bear on the specific portions of subjects covered during the year and each student should be handed a certificate by the head-master showing only the marks obtained by the pupil in the several subjects. No detention of any student is to be permitted at any of these stages and at the final examination, the whole class of students should be presented. At the final examination, the questions will bear only on the remaining portions of the subjects taught in the VI class and all differences in the quantity covered in this year of work between one school and another, will be met by the conduct of examination I have in view. You should not make teaching in the different schools rigid or conform to a dead level. I recognise that the plan of examination suggested by the Sadler Commission is an excellent device, and is the only means of removing the present strain. The Board will comprise as follows:—1. The principal professors of the Colleges representing the subjects, *i. e.*, 6. The head-master, two assistant masters and the Inspector of the ... The Board will examine through papers and also conduct viva voce examination, on the following scheme.

Subjects.	No. of Papers.	Viva Voce.	Marks.
English.	*1. 3 hours duration.	1.	100+50
Vernacular.	1. ,,	1.	100+50
Mathematics.	1. ,,	—	100.
Natural Science.	1. ,,	1.	100+50
History.	1. ,,	1.	100+50
Geography,	1. ,,	1.	100+50

* Each paper will contain 75 per cent more questions than the number required to be attempted.

The Board of Examiners in visiting the different schools, will take note of the equipment, methods of instruction, qualification of the staff, general tone and discipline and their bearing on the students called up for the viva voce for which the Board will, of course, divide into smaller sections. In assigning the marks, due credit will be given to the students' performance in the IV and V classes, as recorded in the certificates, and his class notes and other authentic records of work which have been scrutinised by the staff from time to time. If you come in contact with the examiner you will certainly know more about him than is revealed by his papers alone and if for any reason his performance in the papers should be defective, you have other means of judging his capacity *viz.*, the viva voce, his previous certificates and his records of class work. When the students know that they will be judged by all these tests, the final examination holds no more terrors to them. The certificates awarded to the candidates at the end of the final examination will bear only the marks obtained by the candidates with opinions of the Board about the marked efficiency of any candidate which cannot be expressed in terms

of numerical figures. I do not suggest any practical examination in the science. This examination is not a matriculation, for the High School course I have sketched above is not a preparatiou for the University but provides the minimum general culture so necessary to all who wish either to qualify further for the university or any professional career.

If you accept the recommendation of the Sadler Commission that the preparation for the University course should extend over two years, then the pupil cannot enter the University in the most favourable circumstances, earlier than twenty, but if you make the High School course fairly intensive and wide, this preliminary course needs even then two grades which according to my ideas, will enable the student to enter the college at nineteen; though under the old dispensation there used to be excellent graduates well under that age.

The wisdom of a man is measured by his foresight and judged by this standard, we could not have displayed much of that quality, when we, parents allowed the authorities to carry on the intermediate work in our admittedly weak high schools. They were improved in no way to assume this responsible and new task at the time of founding the University and who can say that any good has resulted from such a proceedure which as I have said already was blessed on all sides on account of its novelty. The Sadler report recommends the institution of Intermediate Colleges with a double purpose *viz.*, as a preparation for the University work and secondly for practical occupations. I am afraid this general training is carried to a late age and the only justification for the suggested plan of the Commission is that at the age of eighteen the students are not likely to be in a position to judge for themselves for what careers they are best fitted. The Commission have had to recommend a general course in the Intermediate for students of eighteen, because their proposals for the

If you reform the High Schools on the basis of staff, buildings and equipment I have set forth above, you may proceed to attach to them in selected districts, the Intermediate work whose model as I conceive it is different. You have got to specially equip these Preliminary Schools which name I prefer to the Intermediate Colleges. In fact the plan I have suggested below is the only way in which the interests of University Education can be freed from motives of preferment in the administrative functions. The main object has been to provide for all the ingredients of a liberal education coupled with a training of special aptitudes which students of seventeen ought to be able to have discovered or discovered to them on the termination of an intensive and wide High School training. At present we are wasting higher training in the sciences and arts on students, with neither ability nor ambition to excel in them, but whose whole field of mental outlook is circumscribed by the four walls of the Government offices. The Compulsory course in the Preliminary Schools will comprise English, Vernacular and Logic and the optional studies will embrace one of the following:—(i) Sciences, comprising Mathematics, Physics, Chemistry, Comparative Anatomy, Botany and Dynamical Geology; (ii) Arts, comprising Modern European History, Modern Indian History, Ancient History of Greece and Rome, Elements of Economics, Advanced branches of Geography and Outlines of Anthropology; (iii) Similarly Departmental tests comprising the lower branches of civil, criminal law, revenue, accounts, office proceedure, and precis and typing; (iv) Civil subordinate engineering; (v) Mechanical subordinate engineering; (vi) Agriculture; (vii) Technological subjects. (viii) An additional vernacular and a classical language, grammar, elements of philology and outlines of the history of language; (viii) Subordinate pleader's test. I omit from this list, pedagogy, medicine and law and no body

colleges should be permitted to select these subjects, for the issues involved in the selection of subjects are of vital importance to the orderly progress and welfare of the community. The standard of admission to these respective studies should be laid down in specific terms of percentages of marks obtained by the students in the final High School examination, it being open to any student to go back and improve his prospects of admission to any particular branch for which his certificate is not a sufficient testimonial. Every one of these branches must naturally lead to the respective faculties in the University if the pupils desire for higher and wider training or the certificates they obtain at the Preliminary Examination ought to entitle them to posts in subordinate services of the different branches of administration and commercial and industrial organizations if we have any. I make law one of the faculties of the University and not a post graduate study like Teaching and Medicine; practice of which require a prolonged and sufficiently deep training in Science or Arts. The institution of a University faculty of departmental tests in their higher branches, in which you offer Degrees is the only way of emancipating your scientific and humanistic studies leading to prove investigations. I have considrably exceeded the space limit I had originally proposed to myself and I must stop at this stage.

Great interest was aroused some little time ago by the reported discovery of a new motor fuel, of which the chief ingredient appeared to be water treated with a liquid which made it equal to petrol at about a tenth of the cost of the spirit. The inventor was careful to guard his secret until it could be exploited on favourable terms, but tests were made in England, which apparently proved all his claims. It has now been discovered that the mysterious fuel is simply acetone, which costs more than twice as much to produce as petrol, and the ingenious inventor is now detained in the United States to answer no charges of fraud.

INDUSTRIAL PROGRESS IN BARODA STATE.

By A. P. Smith.

FROM a perusal of the Annual Report of the Department of Commerce and Industry in the State of Baroda for the year 1918—19, it is impossible to congratulate the Baroda Government on the progress made during the period. Experiment, inquiry, non-success and hope for the future, characterize the activities such as they are, of the department. To quicken the pace apparently the Department of Commerce and Industry and that of the Registrar of Co-operative Societies, both being under one management, were separated, and an additional department of Statistics and Emigration inaugurated. In the last report mention was made of the re-distribution of Agricultural Land; but no particulars as to the manner and extent of re-distribution were afforded. It was a Special Inquiry made by a Committee appointed for the purpose and the Government approved of the recommendations made and rules were framed on the lines suggested, and orders were even issued to take up the re-distribution of agricultural holdings in Ladol with the natural consequence that the cultivators were found to be unwilling, and the remarkable result that the "idea had to be dropped." It was natural for the conservative cultivator class to decline to adopt the proposals of the department; but it is extraordinary that the cultivators were not consulted before everything was cut and dried! The report states that the draft rules were published inviting public opinion and criticism and it may be presumed that, in the absence of hostile criticism the re-distribution was taken up. The Indian agriculturist especially, is notoriously conservative and does worship to the idol of *mamul* and every endeavour ought to have been made to consult and

convert him. If no hostile criticisms appeared, it would seem that there is no properly organized public opinion in Baroda. Another Special Inquiry was the collection of social and economic data relative to the men of two regiments of the Baroda Army—a by no means formidable task but owing to pressure of other work the subject could not be given due attention; and so the new Department of Statistics is to accomplish the task. A third Special Inquiry was undertaken by the Economic Development Committee—and the report was finally drafted and will "shortly be published". A fourth Special Inquiry concerned the Bhadkal Survey. The survey was completed all right, but for some occult reason Mr. Nanavati, the late Director of Commerce and Industry, carried the papers with him to England and will publish the report on the survey on his return. The fifth Special Inquiry related to the advisability of introducing a Terminal tax in lieu of the octroi duties and tolls in force. The inquiry matearealised in a scheme, the proposals for which are before the Baroda Government.

Besides these foregoing Inquiries the following Industrial Investigations occupied the department. The investigations and results are summarized as follows:—(a) Woollen Manufactures—Still in the experimental stage. (b) Cement Manufacture Experimental stage: (c) Wood Distillation—Experimental: prospects promising. (d) Dwarka salt—success achieved in manufacture of table salt. Permission of Supreme Government requested for export purposes. (e) Forest Research Proposals before Government. Further consideration contingent on return of Professor Naik from England. (f) Tanning and tanning stuffs: Report before Government. One factory fairly successful with vegetable tan stuffs—Proposals formulating to train Chamars for the work. (g) Ceramic Industry—Experimental stage. Proposals to be submitted to Government. (h) Manufacture of Deshi paper—Proposals sanctioned.

Under the heading "New Industries" an application for a lease of the salt deposits of Okhamandal for the manufacture of Chemicals which had been forwarded to Government, the year previous, remained still "under consideration". Similarly an offer to start an oil mill was "under consideration". It is something, however, that a lease was extended during the year for the manufacture of Cement, and that the policy of inviting capitalists from outside the Raj and of giving subsidies to local capitalists was continued. As a result of this there were seven applications altogether, four from outside and three inside the State. Three of these were favourably considered, (whatever that may mean) one was under consideration and three were under further investigation. Another business proposal for facilities to manufacture alkaloids and other extracts from duty free denatured alcohol was received and was pending disposal.

While tangible achievement has been negligible it is clear that the State is earnest in promoting industrial effort, for no less than Rs. 3,450,000 granted in the shape of loans, while other valuable concessions in the direction of developing the industries of the State were granted. Hand-loom weaving demonstrations and the introduction of fly shuttle and automatic looms were steadily kept in view, while tentative experimental work in the cultivation and development work of pearl systems, dyes, clays, soda deposits, ore, chinawares, well boring, etc., was done. No meeting of the Industrial Advisory Board was held during the year, but is promised for November of the current year to consider the Report of the Economic Development Committee.

The report under review winds up with a list of Joint-stock Companies in the State from which it would appear that the number

1917—18 was 33 with a total authorized capital of Rs. 13,415,664, a subscribed capital of Rs. 7,437,264, and a paid up capital of Rs. 5,761,871. Of these 3 were "cancelled" during 1918—19 and of the 30 left at the close of the same year 21 were working and 9 were dormant. A list of 19 Benevolent societies engaged in education and other social activities numbers 19. From appendix III we learn that in 1917—18 there were existent 183 factories of sorts with 201 boilers and, at the end of 1918—19, there were only 115 and 129 respectively. No explanation for this alarming decrease is given. In a State like Baroda we can quite understand that, at first, the progress must be slow, but it seems to us that there is a sad lack of expert knowledge and advice, and unnecessary and vexatious delays which result in real business men fighting shy of dealing with the Government; and too little push on the part of the authorities. The market waits for no man, and unless prompt and intelligent response is made to business offers, and the State is prepared to let the enterprizing capitalist make more money than the state recovers in the way of profit, industrial progress will be very slow indeed.

The bee and the wasp used hypodermic needles long before man ever thought of them, and the bee uses formic acid as an antiseptic to preserve its honey from fermentation. The spider made the first suspension bridge according to all the rules of the craft: and some spiders make excellent airships; one of them even makes a diving-bell. The bee makes a wax that we cannot imitate. The silkworm is still the unrivalled manufacturer of silk. To these we might add the ant, which makes tunnels and subways; the mason bee, with its cement work; and the great peacock moth, which called its kind from a distance by wireless telegraphy long before man had dreamed of the possibility

JAPAN AS AN INTERNATIONAL TRADER.*

IT is probable that every authoritative review of the commercial problems which confronted Japan in 1919—and, in a large measure, still confront her—will provide an illuminating study for economists and business men for several generations to come. Her rapid transition in the War years from a debtor to a creditor country, the abnormal, and in some cases the artificial, expansion of many of her industries, the sudden creation and subsequent decline of others, the feverish speculation of her financiers on a continually rising market, and her virtual monopoly, with the United States of America, of trade in manufactured goods in the leading markets of the world—all these phases of commercial Japan during the War, stand in sharp contrast to the reaction which set in after the Armistice.

It is therefore inevitable that the Report of Mr. Hugh Horne, Commercial Secretary to H. M. Embassy, Tokio, on the "Commercial, Industrial and Financial Situation of Japan, 1914-1919" (Cmd. 912, Price 9d. net), will be studied with more than average care by British firms interested in world trade. Its immediate value to our manufacturers and merchants rests in its close analysis of those Japanese industries, and their output, which have entered into strong competition with British manufactured goods in India, China, South America, and elsewhere. Attention is directed to the particular lines in which this competition is likely to be more keenly felt in the "Imperial and Foreign Trade" Section of this issue. We are here concerned only with certain general considerations affecting Japan as a producer of goods for export and as a competitor in overseas trade.

* With acknowledgments to the *Board of Trade*

WAR PROSPERITY.

Immediately prior to the War Japan was experiencing strong reaction from the economic activity which followed the Russo-Japanese War. Commerce and industry were showing signs of depression, the balance of trade was increasingly adverse, and money was not plentiful. This downward tendency continued, and was in fact accentuated after the outbreak of hostilities owing to the general dislocation of trade throughout the world and the disturbance of foreign exchanges, but the early days of 1915 witnessed a sudden and strong revival. A period of unprecedented prosperity set in, and continued without any real setback until after the Armistice was signed, though the economic world experienced a momentary shock in 1916, when it was rumoured that the Germans were going to make peace proposals. Large orders for munitions and other war supplies arrived from the European Allies, and the disappearance of German and other European goods from markets in India, Java, China and other countries in the Far East, created a strong demand for Japanese manufactures. In addition to these factors of development the world's shortage of carrying tonnage stimulated shipbuilding activity to an extraordinary degree, and provided shipowners with lucrative opportunities for charter.

POST-WAR REACTION.

The conclusion of the Armistice in November, 1918, was followed by a period of deep depression and gloomy foreboding. It was generally expected that hostilities would continue for another year or eighteen months, and forward business had been extremely active. The first blow was a sudden fall in prices, due to various causes, such as decreased demand, removal of embargoes in America and Great Britain, and the probable reappearance of goods from belligerent countries. Then came heavy cancellations Africa and Australia, due chiefly to the prospect of obtaining British and other European goods, which had been shut out owing to the war. Business moved very slowly during the first few months of 1919, but subsequently boomed, with the result that the total exports and imports exceeded Yen 4,000,000,000 for the first time in the history of Japan's foreign trade, the balance being in favour of imports. A strong note of pessimism appeared in the Press over the return of the so-called adverse balance, which had been interrupted during the war, but insufficient account was taken of invisible exports, particularly the very considerable returns from the carrying trade.

IMPRUDENT TRADING AND FINANCING.

It was said that Japan had, generally speaking, availed herself of the trade opportunities created by the War. Unfortunately, many manufacturers and merchants, in their anxiety to accumulate big profits rapidly, placed goods of very inferior quality on denuded markets; the imprudent policy was largely responsible for the numerous post-armistice cancellations, and has aggravated the difficulty of consolidating positions in such countries as India and Java. Further, the accumulation of wealth and the plentiful supply of money developed a mania for company promoting out of all proportion to the needs of the country, and shareholders have been far too eager to reap dividends of 60, 70, and even 100 per cent at the expense of prudent provision for future development. At the present moment there in a considerable measure of anxiety in financial circles, but the dangers have been seen, and will, in all probability, be averted. With a sane financial policy and the development of sounder methods among the less important industrial concerns, Japan should be able to retain the high position to which she has attained in recent years.

(*Note.*—The latest telegraphic news from Japan shows that the above-mentioned

a serious slump has now taken place, and the prices of many commodities have dropped heavily.)

FOREIGN TRADE.

Before the War there was always a balance of trade in favour of imports, but on the disappearance of German and Austrian goods from the markets of the world and a steady decrease in the supply of British manufactures and goods from Allied and neutral countries in Europe, Japan seized the opportunity to fill the demand. In particular she increased her exports to Java, India, China and Hongkong, and subsequently she found Australia, South Africa and South America growing markets for her goods. So rapid was her outward expansion, once the disturbing influence of the outbreak of hostilities had passed away, that the adverse balance of Yen 4,634,264 in 1914 was in the following year turned into a favourable balance of Yen 175,857,059.

These fortunate conditions continued throughout the War. In 1916, 1917 and 1918 the excess of exports over imports mounted to Yen 371,040,208, Yen, 567,193,941 and Yen 293,956,835 respectively. The actual figures for the years 1914-1919 were :—

	Exports	Imports	Total.
1914 ...	591,101,461	595,735,725	1,186,837,186
1915 ...	701,306,997	532,449,938	1,240,756,935
1916 ...	1,120,468,118	756,427,910	1,883,896,028
1917 ...	1,603,005,048	1,035,811,107	2,638,816,155
1918 ...	1,962,100,668	1,668,143,833	3,630,244,501
1919 ...	2,098,872,617	2,173,459,880	4,272,332,497

As has already been remarked, the approach and actual conclusion of the Armistice in November, 1918, immediately affected the flow of orders for Japanese and inward; heavey cancellations of orders for Japanese manufactures were reported from such countries as South Africa and Australia, which looked for the re-entry of British and other European goods, and Japanese importer of industrial raw materials hastily the middle of the year 1919 trade revived, and the close of the year saw the total volume of trade exceed Yen 4,000,000,000.

Exports amounted to Yen 2,098,873,000, and imports Yen 2,173,460,000; thus for the first time since 1914 an adverse balance has been recorded. It is hardly necessary to mention the obvious reasons for this reversion to former conditions—Japan's export prosperity was created by the War to supply depleted markets, and automatically decreased on the release of commodities from belligerent countries and neutral countries bordering on the actual theatres of war. Futher, the European demand for direct and indirect war supplies and foodstuffs diminished and then practically ceased.

EXPORTS.

During the War the following goods were shipped in large quantities to the Allies, particularly Great Britain and France, for direct or indirect military purposes :—

Copper, antimony, tungsten, graphite (chiefly to the United States of America for ultimate use in France), fish oils, starches and other subsidiary foodstuffs, waste and raw silk and habutae, cotton tissues, cotton waste, and chemicals.

Other articles which showed a big increase were :—

Sugar, beer, cotton crepe, cotton flannel, cotton hosiery, European and Japanese paper, coal, iron and steel manufactures, porcelain, glassware, enamel ware, cement, electrical goods, brushes, and matches.

Of the foregoing articles, those which are most likely to retain their position are beer, cheap cotton hosiery, glassware, brushes and matches. The reappearance of foreign competition will, of course, affect the demand for Japan's output, but if present quality and [illegible] can be maintained, the hold

on markets in India, Java, China, and South America should not be lost.

Turning now to the year 1919, the trade of which this Report is more particularly intended to review, it is noticed that the chief articles exported were finished goods such as cotton tissues, woollen tissues, silk tissues, silk handkerchiefs, cotton hosiery and other knitted goods, hats, buttons, matches, porcelain, paper, glass and glass-ware, tooth brushes, mats and matting, leather manufactures, umbrellas and toys; foodstuffs (namely beans and peas, marine products, tea, sugar, canned goods, rice, and beer); raw materials and semi-manufactured goods, namely, raw silk, silk waste, cotton yarns, plaits and hats and camphor; minerals, namely, coal, copper and zinc.

It should be observed that while exports have increased slightly in value they have decreased in quantity. The reasons for this decrease are that (1) the ratio of advance of prices has been greater in Japan than in other countries; (2) owing to the prevailing economic boom the purchasing power at home has increased to such a degree that it has been impossible fully to meet the demand from abroad; (3) the European demand for foodstuffs and military supplies has decreased very considerably; (4) European competition has been released.

Exports to China increased considerably in 1919 in spite of the boycott, which started in May and continued with varying intensity throughout the year. This was due largely to the extraordinary rise in the prices of silver and the consequent increase in China's purchasing power. The class of goods principally affected has been finished articles such as toys, soap, looking glasses, refined sugar, patent medicines, umbrellas, etc. This indicates growing industry in China and the reappearance of foreign manufactures, for the Chinese would naturally direct their boycott activities into channels where the exports to China totalled nearly Yen 360,000,000; they amounted to Yen 447,000,000 in 1919.

Cost of Labour.

Many writers and speakers in England *dwell on the cheapness of labour in Japan* and the danger of Japanese competition in foreign and colonial markets, but certain counteracting factors appear to be left out of consideration. It is, of course, true that Japanese labour is still, in spite of great advances in cost, considerably cheaper than labour in the West, but the comparative efficiency is much lower. Under the most favourable conditions the ratio is not higher than 2 to 3, and many writers place it at 1 to 2. In addition to the lower efficiency and increased cost, it must be remembered that working hours are being reduced, partly as a result of the demands of labour and partly in accordance with the decision of the International Labour Conference at Washington. Further, it should be realised that the handling of machinery, generally speaking, leaves much to be desired, and also that labour-saving devices are at present comparatively little used, but this defect will doubtless be remedied as the cost of labour increases. It is therefore open to doubt whether the actual cost of production of competitive goods is lower in Japan than in England; in any case, it is submitted that the difference in favour of Japan is not enough to justify alarmist views, which find wide expression in Great Britain and her Colonies.

Raw Materials.

Japan is singularly deficient in raw materials, and depends on foreign supplies for most of her industries. Raw silk she has in abundance, camphor and sugar in Formosa, copper in the main island. There is at present plenty of coal, but it is expensive, and the problem of future supplies is already engaging the attention of industrialists.

but these are not likely to supplement the output of Japan proper in sufficient measure to keep pace with the ever-increasing demand. There are very few iron mines in Japan, and practically all supplies of ore come from abroad, chiefly from China. In addition to coal and copper, which are the only important mineral products of Japan, gold, silver, lead, antimony, manganese, graphite, tungsten, sulphur and petroleum are found.

Coal is found chiefly in the island of Kyushu and in the Hokkaido: the Kyushu fields of Chikuzen and Buzen (called Chikuho) supply 75 per cent and the Hokkaido field 10 per cent of the total output, which amounted to 28 million tons in 1918. According to a report of the Mining Bureau of the Department of Agriculture and Commerce, the available resources aggregate over 800 million tons, calculation being made mainly on seams lying not more than 2,000 feet below drainage level. Seams lying at greater depth but judged equally workable are estimated to yield nearly 3,000 million tons.

Gold, tungsten and graphite are found chiefly in Korea. Sulphur occurs everywhere, but only the high grade deposits are worked.

Petroleum, found principally in the Prefectures of Niigata and Akita, bordering on the Japan sea, has increased considerably in output since 1914, largely owing to the success of deep boring. At present 50 per cent of the lamp oil demand is supplied by the United States of America and Java. The two principal native oil companies are the Nippon and the Hoden. The only foreign companies operating are the Rising Sun Petroleum Company (British) and the Standard Oil Company of New York.

ECONOMICS IN THE WEST.

The Great Coal Controversy.

London, 23rd September, 1920.—As I wrote, the last words are being said in the great coal controversy which has almost monopolised the attention of the country during the past few weeks to the exclusion of other topics, some of considerable seriousness. What that word will be I will not attempt to forecast, but however the decision may go it is certain that we are on the threshold of great movements in the industrial field. The position of affairs indeed, is such either that there will be a great explosion with far reaching consequences or that, as has many times happened in our history the disputants in the struggle reach some concord at which will ensure a durable and profitable peace. The weakness of the position at the moment is that the extreme doctrines of Bolshevism have taken the fancy of many of the younger generation of workers and that this section is most active and valuable in every trade dispute, carrying, or I should say, dragging with them the older and more sober elements of the industrial community. We have seen this markedly in the present dispute in the mining industry and the same characteristic of exhuberan youth at the prow directing the Labou ship was mainfested in the proceedings o the recent Trade Union Congress. But happily, there are signs of a reaction fror extremism in many directions, notably i the public utterances of such prominer Labour leaders as Mr. Thomas and M Clynes and in the scathing denunciations the young men in a hurry which the vetera Socialist, Mr. Blackford is weekly pourir out in the columns of the Sunday paper which he contributes the most conspicuo feature. I believe that the other Labo representatives have become thorough alarmed at the injury which is being do

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to their cause by its association with the wild cat propaganda of our British Lenins. They know, as every thinking man knows, that the principles or lack of principles of the Russian dictator are absolutely alien to the British temperament and that a continuance of the policy which has recently been pursued—the setting up of the Direct Action Council and the rest—would irremediably damage the cause of Labour in the country. It has to be seen to what extent the moderate men may be able to regain control of the machine. But that there will be a return to sanity on the part of the great mass of industrialists at an early date I do not for a moment doubt.

FOREIGN COMPETITION.

One factor which is hastening and in the near future will still further accelerate the growth of moderate views is the increasing slackness that is coming over trade. Short time is now becoming quite common in manufacturing industry and side by side with it we are hearing lamentations from traders as to the impossibility of meetiug foreign competition on equal conditions. So severe is the pinch in such trades as those associated with gloves and hosiery that the government are being asked to take exceptional measures to prevent the country from being flooded with goods, mainly of German origin, with which our home producers cannot compete owing to the enormous advantage that Germany gains by her low exchange. The call probably will not fall on deaf ears, but no amount of official protection will save the country in the long run from the consequences of the era of extravagant costs and low production which the Armistice ushered in in many directions. For some classes of goods the world having satisfied its urgent needs is looking askance at the high priced British article and is seeking eleswhere for something more suitable to its pocket. Political economy, unfortunately, it is difficult to convince them that there is something terribly wrong with a creed which exalts low production. But the stern logic of events will help to their enlightenment before we are very much older. The coal dispute has been a splendid object lesson for many. For the first time it has dawned upon them that increased output is vital not *merely to the coal trade but to every other* industry and, in fact, to the country's commercial position. A drop in American exchange representing an additional penny in the shilling on our food supplies from abroad was due merely to the threat of a strike. It is now easy for the man in the street to understand why diminished production makes for the high cost of living and how intimately the nation's prosperity is involved in the amount of coal that can be sent abroad in exchange for food products and raw material. Valuable as the instruction has been there is still abundant room for a wider diffusion of economic truth. It is too much the fashion to regard Britain as a self contained entity which can make its own industrial laws regardless of what is happening outside. The working man is not the only sinner in this respect. Recently the *Times* published a long and interesting letter from an eminent writer on economic subjects sketching wage movements in England during the past seven centuries and showing that in the past six years wages have risen 320 per cent. In conclusion he says "the lesson taught by these investigations is undoubtedly that wages when they have once risen never fall ......It is false optimism to believe that the near future will show us a return to old conditions. Unless we permit foreign dumping, the only true solution is to fix a fair rate of wages in all trades and determine that this shall not be increased. History shows that only by stabilizing the controlling factor-wages is it possible to fix the price of commodities. When any increase has been sanctioned it

brought us to another rung in the ladder of wages, of which the lower rungs have been for ever destroyed. "The writer's calm assumption that the existing extraordinary scale of wages will never be reduced is an example of insular short-sightedness equal to that of the coal miner who thinks that he can drive his emoluments upto any point he cares to fix without danger of a subsequent reaction. It practically ignores the factor of foreign competition. True, there is the proviso in regard to dumping, but no legislation against dumping would protect our manufactures in foreign markets, or even in our overseas territory from the effects of the low costs of production in other countries. We already see Japanese, Chinese and Australian coal being imported to Europe because our system of artificially high wages and diminished production have prevented the sale of our own material. That movement is bound to go further and affect all our industries if the existing conditions continue. Our industrialists are in competition with the whole world for many of our goods and necessarily wages here must have some relation to wage payments elsewhere. German competition is already becoming active. What it will be later when the conditions are more settled in Europe we may well imagine. But it is in the East that the greatest industrial influences of the future must be looked for. You in India are buckling on your industrial armour to some purpose. Japan is virile and aggressive in commerce, and China is awakening from the sleep of ages and beginning to put forth her immense strength. In such circumstances it is folly to compare the results of to-day with those of earlier centuries when the conditions were profoundly different, and draw definite conclusions from them. It would be much safer, it seems to me, to regard the present high wage movement in this country as a temporary phenomenon due to the abnormal circumstances of the war—a of the world once more flows in its ordinary channels.

New Sources of Generating Heat and Power.

Our coal troubles have led to a fruitful discussion of the necessity of economising existing supplies and the possibility of finding new sources of generating heat and power. In regard to the former section of the subject action is being taken by the federation of British Industries to obtain information as to the means available for using coal to greater advantage. A good deal of apathy appears to exist amongst manufacturers in the matter. They have so long been accustomed to cheap and abundant coal that they are not immediately impressed with the necessity for a change of method. But that all industrialists are not of this temperament is revealed by a letter from a prominent midland firm setting forth the advantages it had reaped from attention to coal consumption. According to the communication in two small works under the firm's management a saving of upwards of £2,500 a year was effected by scientific control and selection of more suitable coal. In another case—that of a large business employing many thousand hands and possessing a central electric generating station producing current at 7d. per unit the cost, by scientific control was reduced to ·36d. per unit without any additional plant. No doubt with proper arrangements these economics might be made general and a vast reduction in the coal consumption of the country effected. On the other phase of the subject we have to hand much information to show the extent to which oil is replacing coal in our transport system more particularly. Thus at the launching of a great South American liner at Messrs. Vicker's yard at Barrow a few days since Sir James Mc. Kechine, a director, said that while coal at the present price would only carry six pounds of meat from South America to this country,

engines—owing to the greater economy of space which they use ensures to carry 10 lbs. of meat the same distance. He looked forward to the day when all ocean steamers would be oil driven. In much the same vein Sir John Cadman, speaking a litte later at the annual meeting of the Institution of Mining Engineers, referred to what he termed "the new era of fuel." Coal, he pointed out, was no longer holding its own. The navy and mercantile marine were tending to run entirely on liquid fuel. "It was," he said, "being found more suitable to use coal in liquid form. This country would have before long to consider the utilization and re-arrangement of coal constituents so as to conform with the new era." The voices of these experts are worth listening to. The day of coal is doubtless not yet done even in its crude form, but to an increasing degree it will have in the future to compete with other agencies and be compelled to conform to the dictates of commerce based on a preference for oil.

Yet another manifestation of the trend of modern industry in the matter of fuel is supplied by the measures being taken to discover alternative sources of power to petrol for motor propulsion. Professor Harold R. Dixon, F.R.S., under government auspices, has made the subject one for thorough scientific investigation and has come to certain conclusions which will probably bear fruit after they have been fully expounded, as they will be, at a great meeting of motorists at the Royal Automobile Club on Oct. 18. Professor Dixon has strong predilections in favour of alcohol as an alternative to petrol. His researches have related to the physical properties of alcohol mixtures with air and oxygen as compared with petrol pure pentane benzol and ether. It has been shown that alcohol vapour can be compressed much more highly without danger of ignition than the other vapours and experiments are now vapours are added in order to discover the mixture which is sufficiently volatile to give an explosion at ordinary temperatures and yet will stand a high degree of compression without premature ignition. In a conversation with a representative of the *Times* to whom he communicated these facts, Professor Dixon expressed the view that alcohol would come into large use. It would not, he thought, supersede petrol, the latter having advantages for high speed engines that alcohol did not possess, but its use for ordinary commercial purposes would be wide and would certainly tend to bring down the price of petrol.

THE NEW HIGH COMMISSIONER FOR INDIA.

Sir W. Meyer's appointment as the first High Commissioner for India is an event of no ordinary importance in the history of India's economic relations with Great Britain. It imports, no doubt, a new departure not merely in political development, but an advance on new lines in matters of trade. If precedent is followed, the New High Commissioner for India will not hide the light of his department under a bushel in Whitehall. He will come into the open as the High Commissioners of Australia and New Zealand do and open his shop either in the strand or some other prominent thoroughfare and show stay at home people for the first time what modern India is like and what it can do in matters of trade. I suppose such an enterprise would be enough to make some of the old order of civil servants tour in their graves; but of its practical value there is no room for doubt. The shop window diplomacy of the Dominions, indeed, is a far more promising thing than ever was the shirt sleeve diplomacy of Washington.

ARNOLD WRIGHT.

INDUSTRIAL NOTES FROM THE UNITED STATES.

Gas now being made from Straw.

Washington, D.C., U.S.A., Sept. 24, 1920.—A gas obtained by the destructive distillation of wheat, oat and rye straws is now being produced upon a considerable scale at the experimental farms of the United States Department of Agriculture. Although automobiles are being operated with the new combustible, and it has been for some time used for illuminating purposes as well as for cooking, the possibilities of straw gas are as yet for from being fully determined, says the department. In order to fully determine the exact commercial and industrial value of the gas the government scientists are now engaged in conducting an extensive series of experiments.

For a number of reasons, the work of experimentation can be carried on but slowly at this time, but it is planned to do much that will determine the quantity and nature of the gas that may be obtained from wheat, oat, barley, rye and rice straws, as well as from cornstalks, corncobs and other vegetable matter usually burned as waste. If the results of the present tests warrant further investigation the experiments will be at once extended to the problem of plant equipment for producing the gas on a scale sufficient to allow the farmer to supply light and heat for his house, power for stationary engines and, possibly, for his tractor from a small individual outfit. If a suitable unit can be constructed so that the farmer's initial cost will be small it seems likely that the straw gas will have a very considerable economic value in sections of the country where the raw material from which the gas is made is now considered as waste and burned or left to rot in the fields. In some sections of the United States the straw is used as fertilizer, but in the west and north-west there is an unlimited supply of the material available for conversion into light and fuel for the farm home as well as for industrial and commercial purposes along almost unlimited lines.

While it has been found possible to operate automobiles and auto trucks with the straw gas, and it is known that fifty pounds of straw will produce about 300 cubic feet of gas—which is an amount sufficient to drive an ordinary automobile roadster for fifteen miles the problem of reducing the gas to liquid form or condensing it sufficiently to allow it to be carried conveniently is an essential one which must be satisfactorily solved before the straw gas can be considered as a standard motor fuel. This is another of the tasks in this connection being taken up by the engineers of the Department of Agriculture.

Interesting as is the subject straw gas is not a new thing. The present process was discovered and developed to an extent by George Harrison, a Canadian engineer, at Moosejaw, in 1914, who later co-operated on the project with Professor MacLaurin, of the University of Saskatchewan, Saskatoon, Canada. This university, in conjunction with the United States Department of Agriculture, exhibited a straw gas equipment at the Exposition of Chemical Industries in New York City during the fall of 1918. This equipment was really the starting point of the present series of experiments which are resulting in such interesting developments. The exhibit shown at the New York exposition referred to was purchased outright by the United States Department of Agriculture. The first tangible and practical result of the experiments was the running of an automobile with the product, which was done in and near Washington. However, in this case, the fuel supply was carried in a large flexible bag on the top of the car, a method of doubtful practicality as a general practice.

The experiments are developing that several very valuable by-products are being obtained in the process of manufacturing the straw gas. Carbon residue suitable for manufacturing lamp-black of exceptionally fine quality is one. This residue also contains certain amounts of potash, phosphates and nitrogenous compounds, all of which give it fertilizing value.

The tar and ammoniacal liquids resulting from the process, aside from their value as disinfectants and preservatives, will undoubtedly prove useful in the dyestuffs industry. If the engineers succeed in perfecting the present apparatus and in reducing the cost of production there is no doubt but that straw gas will prove to be one of the most important commercial discoveries in many years.

TURNING SMOKE INTO MONEY.

The United States sends billions "up in smoke" yearly because of the enormous waste in the fuel used by our industries. On the other hand, there is a man in Washington who has discovered how to turn smoke into money and he is now busily engaged in teaching the rest of the country how to perform the same trick. He does this by means of devices which, through electrical precipitation, not only reclaim vast wealth from the smoke, dust and fumes of smelters and other plants, but at the same time redeem thousands of acres of nearby land. As a matter of fact, the curb which he has put upon the smoke and dust nuisance—which was his original aim—now actually bids fair to be, in some directions, the primary reason for the running of certain of our industries. The smoke wizard who has accomplished these remarkable things is Dr. Frederic G. Cottrell, chief metallurgist of the U.S. Bureau of Mines

Dr. Cottrell's experiments brgan several years ago when a member of the staff of the University of California, he was called upon to solve the problem of helping a smelter gases and vapors from this smelter, resulting from the sulfuric acid parting process used in treating gold and silver bullion, were declared a nuisance by neighbouring farmers and seemed likely to provoke costly litigation and possibly lead to a shut-down of the plant.

The gases discharged into the air amounted to substantially 5,000 cubic feet per minute and held in suspension an important proportion of sulfuric acid in the form of a fine mist. The corrosive action of the acid, swept broadcast by the shifting winds, was felt throughout the entire zone and both the agriculturists and the people generally had ample reason for complaint. The smelter was a profitable one and the management was anxious to find some way to abate the nuisance that was both a menace to health and hurtful to vegetation.

Dr. Cottrell's preliminary work brought up some puzzling situations. Up to a certain stage matters went well enough on the miniature scale of the investigational tests, but beyond this was the question of meeting the practical situation presented by a large commercial smelter. A big part of Dr. Cottrell's achievement lay in spanning the gap between the laboratory and the industrial plant and in finding ways to control the enormous pressures of the necessary electric current, mounting up to 100,000 volts.

The problem was solved, however, and so well was the precipitator installed at this smelter designed that it has been doing satisfactorily ever since. Further, by mere chance, Dr. Cottrell attacked at that plant what is commonly admitted to be the most difficult of all problems of smoke or fume abatement: the precipitation of acid mist.

The good results obtained in this first instance soon became widely known and a new line of application was opened a short time later when a great California copper smelter was threatened with fume litigation by the United States Forestry Service.

and sulfur dioxide gas, invisible to the eye, given off from the stacks of the smelter, had swept the neighboring country bare of vegetation for miles, and it was a case of either a shut-down or a suppression of the destructive discharges. A full sized plant of the Cottrell type was, accordingly, installed. The volume of the grass treated averaged between 200,000 and 300,000 cubic feet per minute, and during the filtration tests made throughout a period of nine months it was found that the electrical precipitation recovered between 80 and 90 per cent of the suspended matter. With later improvements in detals of construction the efficiency was raised well up into the nineties.

The general public has only the faintest notion of the wastage represented in the fumes and smoke from belching stacks, quite apart from the beneficient economies following from the abatement of out-pourings harmful to man and vegetation. In the smelting of lead the fume contains anywhere from three to ten per cent of the volatilized metal in the form of lead oxide and lead sulfide, with compounds of arsenic and antimony. This percentage is well worth recovering. Dr. Cottrell is authority for the statement that during the smelting and refining of various ores not less than 36 valuable substances are found in fumes which, if not collected, would be lost.

About all that need be said in description of Dr. Cottrell's method is that he demonstrated that the mere presenee of an electric current would cause free particles of foreign matter to be precipitated from a gas. That, with the development of means for applying and controlling the current and for collecting the precipitated dusts, is literally all that there is to it. Seldom, indeed, has so simple a discovery led to such wide consequences.

The Great Loss from Rusting of Metals.

It is now quite universally admitted that the rusting of iron and steel is one of the If we assume an average life of steel to be 33 years, as is usually the agreed-upon figure, the depreciation charge of 3 per cent represents, according to experts of the United States Bureau of Mines, a yearly loss of more than one million tons of product in this country for the crude or semi-finished material alone, exclusive of correlated manufacturing costs.

The inevitable rusting of steel may be claimed, and justly, to be the mainstay of the zinc industry, as 60 per cent of the metallic zinc used in the United States is for galvanizing iron and steel articles, representing an annual outlay of over $ 20,000,000 in the endeavour to protect metals from decay and rust. Enormous amounts of paint are used in a like endeavor. About five million tons of coal are needed in the production of steel to replace the annual waste, and one million tons more for replacing the zinc that is annually lost. No possible estimate can be made of the value of brass, bronze, copper, aluminum, nickel, tin, and other metals and alloys used in machine parts, as sheathing, for plating, etc., to protect steel, or as a substitute for it in places where it would be used, but for its lack of resistance to atmospheric attack.

Motor Car Emergencies.

Comparatively little skill and practically no technical knowledge are required to enable a person to drive a motor car under ideal conditions. The real test of motoring qualifications comes with the unexpected situations.

Recently, an owner-driver stalled his engine on one of the busiest New York City street crossings. When he kicked his starting motor pedal the engine-cranking mechanism failed to respond, due to a run-down storage battery. The frantic search that followed failed to disclose a hand-starting crank in the tool box or under the seat. in disgust the traffic police officer helped to

then a young man stepped out of the crowd and offered his assistance.

"If your engine is all right," he suggested, "I think I can start it for you."

"Go ahead, if you can," urged the owner duhiously.

Picking up a jack, the young man raised one rear wheel from the ground and threw high gear into engagement. Then he turned the jacked-up wheel in a forward direction, being careful to pull up and lean away from it. In an instant the motor was humming and after throwing the gears into the neutral position and removing the jack the friend-in-need smiled his appreciation of the owner's copious thanks and went his way.

It was a simple plan, as most successful mechanical adaptations are when demonstrated.

Early this past summer a New England motorist found himself on a road several miles from the nearest garage with a flat front tire and no jack. Noting a fence rail at the side of the road, he selected a sound, straight piece of timber. Next he built a solid pile of stones two and one-half feet high in the road in front of his car. Then he laid the rail on the pile so that it made an angle of about fifteen degrees with the road, and ran his car up against the incline with sufficient force to raise the damaged tire clear of the road, and thus permit an exchange of rims. Having his rear wheels on solid ground it was a simple matter to back off from the improvised jack when the repair was completed.

An Improvement in Electric Welding.

Electric welding has two principal applications, the arc and resistance processes respectively, spot welding being a special modification of the latter applied to sheet work. These applications are well known in practice, but they are unsuitable for complicated work or for sections of irregular profile. For such work the so-called "fusion process" is now coming into general use in the United States. According to this process the two close to strike a series of arcs between them. The pieces are then gradually drawn together, so that the whole welding area appears to be enveloped in a shower of sparks, the sections being thus gradually melted in an even manner over the whole area to be welded. The current is then switched off, and the two pieces are then pressed together and united.

The advantages claimed for this process are that the ends to be welded need not be carefully trimmed beforehand, since irregularities are melted away in the process, and, further only a small ridge is formed at the weld. It is preferable to trim this level with a chisel while it is still red hot, but to avoid forcing the pressed-out portion into the welded seam it should not be hammered, as in ordinary butt-welding.

The strength of welds made by this process is claimed to be 98 per cent of that of the unwelled material, and the process can be successfully applied for welding tube strips or similar material, and especially for welding tool-steel cutting ends to ordinary iron or steel holders. In such cases, and for all large sections, it is advisable to bring the pieces to a red heat by using the current as in ordinary butt welding forcibly separating them if necessary with the current switched off before separating the fusing process.

Twisting Eggs in Paper for Mailing

The safe delivery of eggs to be sent through the mails will be insured and their period of freshness prolonged at the same same time by the use of a new system which has just been patented and is now being called to the attention of egg dealers and shippers. The patent is on a machine which wraps the eggs in a long strip of paper, the eggs being entirely covered by the paper which is twisted about them, making them resemble a length of sausages more than anything else. The paper in which they have been encased has been dampened, and in this condition the eggs are draped around a collapsible wire frame. When they are placed in a box for shipment they are supported so that they cannot come in contact with each other nor the box, and they are thus enabled to withstand a rough experience which would be disastrous under ordinary conditions.

NOTES.

In the House of Commons the other day Mr. Tillett asked the Prime Minister whether his attention had been drawn to a statement made by the American Comptroller of Currency that 35 billion dollers, or more than three times the total banking power of the whole world in 1890, belonged to the United States of America; that the banking power of the United States of America had grown more in the last seven years than in the entire century and-a-quarter which elapsed from 1789 down to 1913; that that country had been swiftly transformed from a debtor nation, owing to the rest of the world, as it did in 1914, some four or five billion dollars, into the world's greatest creditor; that the total reserves of the national banks of the leading countries in the world, including the Bank of England, the Bank of France, the Bank of Italy and the national banks of Spain, the Netherlands, Belgium, Norway, Sweden, Denmark, Switzerland, Roumania, Japan, Germany and Austria-Hungary, aggregated at the normal rate of exchange approximately 51 billion dollars, but at the present rate of exchange were worth, in American money less than 12 billion dollars, which was about one-half of the reserves of the great national banks of the United States of America alone, exclusive of the reserves of their federal reserve banks; and whether the government were keeping these facts in mind in shaping their national and international policies. Mr. Chamberlain, who replied, said :—The figures quoted by the hon. member do not correspond very closely with those that I have seen nor does a comparison between the national, bank of the United States of America and the national banks of other countries named seem to me very instructive, as the institutions, though described by the same name, are very different in character. As regards the last part of the question, the government endeavour to keep all pertinent facts in mind in framing their financial policy. Perhaps I may be allowed to add that, whilst not accepting the comparison suggested in the question, we can afford to view not only without jealousy but with satisfaction the growth and improvement of banking in other countries.

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A meeting of the Full Board of the U. P. Board of Industries was held at Lucknow on the 6th October. Among the questions discussed was the scheme prepared by Mr. Ormerod for the introduction of more peripatetic weaving schools in place of the districts weaving schools. Though the Board approved the scheme generally, they were not prepared to recommend the discontinuance of the district weaving schools at the present stage. It was then dicided to request Government to form a Committee of Enquiry to go into the matter with special reference to the feasibility of introducing the co-operative movement for the benefit of the weaving classes. The Board also considered the question of an All-India Chemical Service proposed to be instituted by the Industrial Commission. The Board after full discussion resolved that they were opposed to the institution of such a service and considered that it should be left to the local Government to decide how they should fill Chemical posts under their control. The next important item which was considered by the Board was the award of State Technical Scholarships under the Reforms Scheme. They agreed to the proposal that in future these scholarships should be provincialised. In this connection the Board also endorsed the proposal of the Secretary of State for India regarding the increase of the deposit for initial expenses from £15 to £40. The Board approved the proposal to increase the staff of the Factory Inspection Department of this province. The Board generally approved of the principle of providing facilities to short-time experts coming to India to demonstrate by the medium of demonstration factories the advantages of improved methods of manufacture.

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The Comptroller of the Currency at Washington has just issued a report on the National Banks of America. On May 24, 1920, the number of deposit accounts in the national banks of the United States reached a total of 20,380,350, an average of one deposit account for every 5½ members of the population, which shows an increase of 165 per cent in

ten years. Pennsylvania heads the list of States in regard to numbers, New York coming second with 1,681,581 accounts. The resources of the national banks on May 4 aggregated $22,038¼ millions, a record total with the single exception of December 31, 1919. Individual demand and time deposits on the same date stood at $13,534 millions, the ratio of loans and discounts to deposits being 72·61 per cent, as compared with 62·28 per cent. a year ago. Loans and discounts on May 4 amounted to $12,288½ millions, an increase of $294 millions since February 28,1920. During that period the reserve and centre reserve cities of the country outside of New York City showed a net reduction in loans and discounts of something less than $2 millions.

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A London Correspondent writes:—Wood-blocks as a method of road construction are rapidly losing favour within the city and the West End, and at the present moment many streets hitherto laid with blocks are being resurfaced with an asphalt substance. This material is a bituminous asphalt made by the mixture of bitumen, the solid constituent of oil, with very fine sands and "filler." It is being laid on the existing road foundation in two layers, the bottom usually just over three inches thick, called the "binder course," being mixed with broken granite or stone, and the top of "carpet" being one inch and a half in thickness and mixed with fine sand to give a smooth surface. The work can be done so quickly, in comparison with wood-paving, in which process it is necessary to wait for the cement foundation to dry, that the two layers can be laid simultaneously, and the road opened piece by piece to traffic a few hours after completion. Incidentally—a point of interest to surveyors—the cost, apart from the question of foundation, is about half that of wood blocks.

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According to the Department of Statistics of India, 1,165 motor cars were imported into British India during August, 1920, of which no less than 916 were consigned from the United States, 139 from the United Kingdom and 32 from Canada. The number of motor cars imported during the five months April, to August 1920 was 6,457, valued at Rs. 252 lakhs, as against 2006, valued at Rs. 58 lakhs in the corresponding period of 1919. Of these from the United States, 755 from the United Kingdom, 542 from Canada, 42 from Italy and 25 from France. The country of origin of many cars shipped from the United States is, however, Canada, Bombay imported 2,408 Bengal, 2,226, Madras 844, Karachi 495 and Burma 483.

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A London Correspondent writes:—I was shown a watch this week—a sample that had been sent to London by a Swiss firm. Certainly it was not a thing of any very great beauty or delicate form, but it ticked with apparent regularity, and its hands, when I saw it pointed approximately to the correct time. In other words "it went." These watches are being offered by this Swiss concern at the amazing wholesale price of 2s each, or at a price which should mean to the general public a watch cheaper even than the "bargains" which were regular features of all the Strand shops, where, before the war "compulsory sales" were in progress all the year round. One wonders, however, if the manufacture of these watches is undeniably Swiss.

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There is a lake in British East Africa—Lake Magadi—that is famous for its vast deposite of soda. Ordinarily the lake looks as if it were frozen and covered with a coating of snow partially thawed, then frozen again. The temparature gives the lie to this appearance of roughened ice, for the heat is extreme, and at midday almost unbearable. The soda burns one's feet even through the shoes, and the sharp frosty spikes will pierce any except the thickest soles. The lake contains millions of tons of soda deposits, and both surface and underground streams of saturated soda liquor continually feed it. The present supply is enormous, and as fast as it is removed a new surface, formed from the mother liquid be-neatb, replaces.

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The *Daily Gazette* of Karachi, which devotes two leaders to Dr. Gilbert Slater's review article on Mr. Moreland's book published in the issue of our *Journal* for August last, calls it a "very excellent one." It draws pointed attention to the comparison it institutes between Akbar's India and Modern British India.

GLEANINGS.

The average wholesale price of wheat in the Punjab in August rose slightly to Rs. 5—2—0 per maund, the rise being mainly due to the early cessation of the monsoon. The average wholesale price of gram also rose slightly to Rs. 5—9—0, the rise being almost general.

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The area sown with groundnut up to the end of September 1920 is estimated at 1,041, 500 acres which is about 13 per cent above the estimate of 91,93,000 acres made on the corresponding date last year. The increase is due to the high prices obtaining for the crop.

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The output of sugar in Jamaica from this year's crop will probably be 15 per cent below last year's amount, owing to the effect of droughts. The tobacco crop has suffered severely from the same cause, and the demand for irrigation in the plains is gathering strength.

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The area planted with Sugar-cane up to the end of September 1920 is estimated at 92,100 acres which is only about 5 per cent below the estimate of 87,900 acres made on the corresponding date last year.

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Cuban railways are being equipped for oil [illegible] in need of rolling stock, and the 5,000 cars which it has borrowed from the United States are about to be called in.

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Sir Liege Hulett, the leading sugar-cane and tea planter in Natal, declares that the local tea industry is dying for want of labour, and that in a couple of years' time there will probably be no tea grown in the province.

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From October 23 to Novemper 2 the Czecho-Slovak Aero club will hold the first International Aeronautical Exhibition in Prague under the patronage of President Masaryk.

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At the request of the Chamber of Commerce of British Guiana, the Governor of the colony has appointed a committee to inquire into causes of the increased cost of living.

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Emigration from the British West Indies to sugar estates in Cuba and Santo Domingo is continuing. From Jamaica alone labourers are going to Cuba at the rate of nearly 2,500 monthly.

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One hundred thousand francs (£2,000) annually will be contributed by the Chinese Government towards the maintenance of the Chinese Institute at the University of Paris.

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British capital is to be invested in British Guiana in purchasing large tracts of land for the cultivation of cassava. Active operations will be commenced early next year.

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An inhabitant of Mayence has discovered a method of securing by the combination of electrical and hydraulic energy and inexhaustible supply of heat without coal.

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It has been decided to remove the restrictions on exportation from Australia of sheepskins, wool tops, wool noils, wool waste, and manufactured woollen goods and yarns.

Senor Aguirra Prigio, the Ecuador Foreign Minister, has officially declared that yellow fever has completely disappeared from Guayaquil and the Guayas Valley.

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Direct regular wireless telegraphic communication has been established between the Karlsborg Station in Sweden and the San Paolo Station at Rome.

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During the 10 months to the end of April, exports from South Australia amounted to £15,444,006, an increase of £8,163,698 compared with the previous year.

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Of the 200 returned soldiers who have been training for the teaching profession in Ontario nearly all were successful in passing the courses prescribed for certificates.

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The passenger and goods air service between Paris and Geneva has been in full operation since the beginning of July. Fares are 900f, single and 1,350f. return.

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For charging excessive prices, three Metz shopkeepers are to have announcements of their convictions published daily for a week in the local Press.

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As sugar, reserved for home consumption, at special prices, has been exported from Barbados, imprisonment is now the penalty for this offence.

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State control of the corn trade in Sweden has been discontinued and thus the last of the Swedish wartime restrictions has now disappeared.

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Moscow reports that the first electric train in Russia has been built in the Baltic Works, and that it will have a speed of 31 miles an hour.

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A conference of nurses of the northern cuss the questions of an light-hour day and salaries.

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Hydro-electric power schemes, to cost 10,000,000 yen, which will take three years to complete are being set on foot in Korea.

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Arrangements are being made for organizing an air service between Mahe and the various islands of the Seychelles group.

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The Australian Government's prohibition of the export of sheepskins, fabrics, woollen yarns, and wastepaper has been revoked.

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Two sugar concerns operating in Formosa recently declared dividends of 100 per cent, and another company 108 per cent.

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Formosan sugar interests have bought up a large proportion of the Java crop and profits are stated to be enormous.

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An aerial mail service between Mexico City and Tampico is to be established by the Mexican Government.

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Owing to the shortage of coal in Canada, a number of industries have had to close down for a time.

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Montreal sugar refiners have decided to lower the price of sugar from 1s. 2d. to 1s. 1d. per pound.

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Direct wireless communication has been established between Rome and Sao Paulo, Brazil.

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Brazilian exports for the first half-year of 1920 amounted to £66,677,000 and imports to £51,021,000.

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At East St. John (New Brunswick), one of the largest dry docks in the world is under construction.

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Arrangements are being made for British

ECONOMIC NOTES.

SWISS WATCH-MAKING INDUSTRY.

The Acting Commercial Secretary to H. M. Legation at Berne writes :—

The most prosperous Swiss industry in 1919 was the watch-making industry. Statistics for the first quarter of 1919 showed an increase in the value of exports, amounting to 21·2 per cent. and during the second quarter an increase of 26·73 per cent, as compared with the corresponding periods of 1918. The total value of watch exports from Switzerland for the first half of 1919 amounted to 128,387,701 francs, compared with 101,774,432 francs for the first half of the previous year. It must be noted, however, that there has been a marked decrease in the export of Swiss watches since January of the present year, and during the last three months in particular there has been a crisis in the production of the cheaper qualities, unemployment and half-time working being on the increase. In the output of gold watches, however, there is no sign of reduced business, in spite of the import prohibitions of various countries.

Exports to the United States and United Kingdom.

As regards the actual number of watches exported, and compared with the same periods, the statistics show a diminution of 347,246, or 4·2 per cent. This reduction chiefly applied to finished watches. On the whole, exportation to the United States of America was not quite so large as in the foregoing year, and here, again, the number of finished watches exported was reduced, *viz.*, from 1,669,838, valued at 20,165,117 francs, for the first half of 1918, to 1,523,337, valued at 23,723,175 francs, for January-June, 1919. Exports to the United Kingdom declined still more, falling from a total number of 2,623,212 watches, valued at 20,235,572 francs, to 1,571,722, valued at 16,477,692 francs, in the periods mentioned above. These two countries—the United States and the United Kingdom—are the most important markets open to the Swiss watchmaking trade.

Trade with other Countries.

Business connections with Italy in 1919 improved un-expectedly, which may be explained by the fact that Italy had the advantage of having a more direct commercial intercourse with the East.

At the same time trade with France also developed to a certain extent, thanks to the modification of import restrictions, which permitted a larger quantity of goods to enter the country. On the other hand, the German Government prohibited the importation of watches into their country, so that business with Germany, as also with Austria, practically ceased. Exports of watches to Scandinavia seem also to have diminished. On the other hand, there are indications that overseas countries are trying to complete partly-exhausted stocks.

Manufacturers' Difficulties.

Although manufacturers have not the same difficulties to contend with as during the war, there are still obstacles to be overcome. These include the demands of the Workmen's Union with regard to wages and the length of working hours. The shortening of the hours of labour was partly counterbalanced by the increased use of improved machinery, which kept the rate of production at about the same level. Fluctuations in the rate of exchange afford another problem. Swiss manufacturers see themselves obliged to direct their attention towarde supplying markets in countries where the rate of exchange enables business to be satisfactorily transacted.

The question of labour is at present the most difficult one to solve: it is hard to find a sufficiently large number of skilled workmen in order to execute the large number of orders coming in, especially in the Jura district, and new factories have been established in Geneva.

Watchmakers, more especially those who turn out highclass quality goods, may look with confidence into the future, all the more so as it is to be hoped that in the course of time countries with low rates of exchange, or in an unsettled political state, like Russia, will in time open their doors again to the Swiss watch trade.

INDUSTRIES AND COMMERCE.

Company Promotion in Bengal

The annual report on the administration of the Indian Companies Act in Bengal, by Mr. W. Stather Hale, O.B.E., A.C.A., Registrar of Joint-stock Companies, is of more than usual interest this time, the slap-dash boom of last year being the main burden of the song which the author sings. When the present office of the Registrar was established under the new Act of 1913 there were only 900 companies on the books. In Bengal there were 1,744 companies at the close of the last financial year, as compared with 1,267 on March 31, 1919; and with 444

companies added, which are established outside of British India, the grand total comes to 2,188. The paid-up capital with Rs. 53,77,82,688 in 1919-20, as compared with Rs. 45,66,63,797 in 1918-19.

The number of companies and societies registered during the year under review shows a remarkable increase over those of the previous twelve months. They were, indeed, no less than 328 in excess. They ncluded 157 public and 107 private trading companies, total 264, besides 57 mining propositions, 73 tea and planting concerns, and 25 banking and loan corporations.

The rush of registration of new companies of an industrial nature resulted, the Registrar states, in a time of feverish activity on the Stock Exchange, shares being dealt in at large premiums even before the companies were registered, but this state of affairs came to a sudden end in October last. It is, however, interesting to observe that the registrations of the latter half of the year under review were greater than those of the first half, the figures being 294 and 238 respectively. Some of the enterprises inaugurated during the past year have undoubtedly bright and prosperous careers in front of them, others will pursue an even course of usefulness without achieving great results, but it is to be feared that not a few have been born but to fade away and sink into well-deserved oblivion.

The new banking and loan companies include several industrial banks formed with the object of supplying capital to trading concerns engaged in the development of commercial enterprise. If soundly managed, these banks should prove of considerable benifit to the community and their career may be watched with interest. Some insurance companies have been floated with ambitious programmes, and with business expanding there are great possibilities in the future; it will be interesting to observe whether their achievements correspond to their expectations.

The future of the new navigation and shipping companies is obscure, as they are liable to be subjected to severe competition. The exceptional prosperity of the jute and cotton trades has no doubt been the cause of the flotation of several new mills, and this notwithstanding the increase in price of land and cost of machinery and labour. The increase in the number of new tea companies may be attributed in a large measure to advantage having been taken of the prevalent speculative fever, and it is to be apprehended that some of the mufassal enterprises that have been launched have little prospect of ultimate success. Indeed the reflection is almost irresistible that the primary object in the inception of those companies is the immediate pecuniary benefit of the promoters.

The difficulties, under which colliery business is being carried on at the present time, are only too well known; nevertheless there is a decided increase in this direction, also in the formation and development of new concerns. Among the trading companies will be found quite a considerable number with capital ranging from Rs. 5,000 to Rs. 50,000 established with the avowed objects of the regeneration of Bengal and the inculcation of business habits amongst the Indian inhabitants. As far as it is possible to judge 306 companies under Indian management were registered during the year under review as compared with 71 the previous year.

The Registrar concludes his report with an expression of regret at the increase that has taken place in the law cases that have of necessity been instituted against company promoters for the attempted ingenious evasion or positive disregard of the salutary provisions of the new Companies Act.

FORESTRY.

Empire Timber Exhibition.

The Department of Overseas Trade is to be congratulated on promoting the exhibition of timber grown within the Empire which was opened at the Holland Park Skating Rink on July 5th and closes on the 17th. To many people the wide range of these timbers will come as a surprise. A large number are hardly known in the United Kingdom; but even a brief study of the exhibition will satisfy one that there is scarcely a purpose to which timber can be put for which the Empire does not furnish a suitable tree.

Practically every timber-growing country in the Empire is represented either by an official exhibit or a private firm, or both. The Dominions of Canada, New Zealand and Newfoundland, the Indian Empire, the Governments of Western Australia, New South Wales, Tasmania, Union of South Africa, the Administration of British Honduras, British Guiana, Ceylon, Gold Coast, Trinidad, Fiji, Nigeria, and East Africa Protectorate are all exhibiting.

Specimens are shown both in the rough and in the finished state, polished and unpolished—everything from the sawn log to the carved panel, from a lead pencil in cedar to a railway carriage in teak. A feature of the Western Australian exhibit is a

room and furniture made of jarrah (Western Australian *mahogany or everlasting wood).* The extraordinary durability of this wood is exemplified by various posts and rafters which show little sign of deterioration after periods of sixty years in the ground or root as the case may be.

A particularly attractive section of the exhibition is that dovoted to the timbers of India. Messrs. W.W. Howard Bros. & Co., agents for the Government of India, have been at great pains to show the practical possibilities of several unfamiliar timbers. In particular, attention should be called to the parquet floor and staircase of silver-grey wood, which has a delicate grey colour and a satin-like lustre; and still more to the billiard-room, which is panelled in laurel wood. This wood is of a golden to greyish-brown colour, with deep streaks and markings of a dark umber shade, and it has a bright metallic sheen on the surface when planed and polished. It is undoubtedly a very beautiful wood, and suitable for the finest decorative work. As it can be obtained in large sizes it is admirably adapted for panelling. Another attractive timber which is seen here to great advantage is Andaman padauk. This varies in colour from pale cherry to crimson and vermilion, and is generally streaked with darker shades which sometimes become a deep black. The texture is fine and hard, and the wood is extremely strong and durable. A railway coach built at the Great Eastern Railways Company's works is on view. It contains first and third-class carriages decorated throughout in silver greywood and padauk respectively.

The exhibition should have important results for the home timber trade in making known the resources of the Empire, and it is to be hoped that it will lead to the development of new sources of supply, the extension of established ones, and the study of a world-wide range of timbers.

CANADIAN FORESTRY DEVELOPMENT.

The Report of the Director of Forestry (Department of the Interior, Canada) for the fiscal year ended 31st March, 1919, states that the policy of economy which has been followed during the war was continued during the year. All controllable expenditure was kept to the lowest proportions possible, and no new lines requiring large expenditure were opened up.

While the practice of economy continues necessary, it is pointed out that the expenditure of Canada on forestry, compared with the forest area, is the smallest in any progressive country of the world desirous of taking its place in the world markets as an important and permanent factor.

The position of Canada in the world as a forest country is a large and important one; in the British Empire it is even more important. The situation in Canada is complicated, however, by the fact that the forests are divided in ownership among a number of Governments which have independent jurisdiction, but it would seem that, in response to the call from the Imperial Government, some wider system of co-operation between the Federal and Provincial Governments might be worked out.

The necessity for well-organized research work in forestry becomes more and more manifest as the forests become more mature and timber operations develop.

The appropriation for the year under review was 650,000 dols. The field expenditure, exclusive of tree-planting on prairie farms, was divided as follows among the provinces:

	Dols.
Manitoba	88,295
Saskatchewan	132,709
Alberta	165,825
British Columbia (Railway Belt) ...	98,362
Total ...	485,193

TREE PLANTING.

The distribution of trees from the forest nursery stations at Indian Head and Sutherland, Saskatchewan, for planting on farms on the prairies, continues steadily from year to year. In the spring of 1918, 5,765,000 trees were distributed to 4,388 applicants. In the southern parts of Saskatchewan and Alberta the early part of the summer was very dry with considerable wind, so that the conditions for the establishment of plantations were far from good. Such a season, however, brought clearly before the farmers the advantages of proper preparation of the soil and of thorough cultivation thereof after the trees were set out. Although there were considerable losses in some plantations, in places where proper preparation and cultivation of the soil were thoroughly practised, they were small and almost negligible. Since the inauguration of the system of distribution of trees to prairie farmers, 49,849,271 trees have been distributed, and in all cases where reasonable care was taken and instructions followed, the plantations have been, and continue to be, successful. The number of trees ready for distribution in the spring of 1919 was 5,388,714.

The number of trees planted in the forest reserves was 196,350, mostly white spruce, jack pine, and Scotch pine.

TREE SEEDS FOR GREAT BRITAIN.

In response to requests from forestry authorities in the United Kingdom, tree seeds were collected in British Columbia by officers of the Forestry Branch. These were forwarded to the Forestry Commissioners for Great Britain to be used in the carrying out of re-afforestation plans under way in the United Kingdom. The seeds included those of Douglas fir, Sitka spruce, Alpine fir, and of other species which the British authorities desire to test.

TIMBER OPERATIONS.

There was a considerable increase in the timber operations in the forest reserves during the year. The high cost of lumber and the high cost and scarcity of fuel resulted in many more people than usual resorting to the forests for their supplies. The number of permits issued for wood and timber was 4,142, and the quantities cut there under totalled 6,783,104 feet board measure; 1,065,934 lineal feet, and 43,557 cords. The number of free permits was 1,715. There were twelve mill-site locations on the forest reserves occupied for cutting lumber for settlers under their permits. Twenty-one timber sales were in operation during the year. The out of saw-timber on such sales was 1,607,362 feet board measure; of mine props, 2,188,767 feet board measure, and 1,212,752 lineal feet; and of lagging, 1,455 cords and 400,000 lineal feet.

LOSSES FROM FIRE.

There were 116 fires on the forest reserves, as compared with 159 in the previous year. Eighty-one of these fires burned over more than ten acres each. The total area burned over was 109,735 acres, of which 3,529 acres were covered with merchantable timber, and 26,472 acres with young trees.

TRADE WITH MEXICO.

According to figures compiled by the Dominion Bureau of Statistics the value of imports into Canada from Mexico for the year ended 31st March, 1920, was 2,648,915 dols., as compared with 514,047 dols. for the year ended 31st March, 1919; 664,790 dols. for the year ended 31st March, 1918; and 677,551 dols. for the year ended 31st March, 1917.

The values of exports from Canada to Mexico during the same period were 410,825 dols., compared with 568,943 dols., 482,428 dols., and 70,330 dols. respectively.

IMPORTS OF PETROLEUM AND GUMS.

Well over half the value of imports for the year ended 31st March last was contributed by petroleum products, the import of which was valued at preceding twelve months, nil in the year ended 31st March, 1918, and 14,927 dols. in the previous year. Gums and resins accounted for 610,757 dols. in the past year, comparing with 517,738 dols., 578,040 dols., and 528,632 dols. in the three preceding years.

Exports call for no special comment except that shipments of pipe and tubing were made in the past official year to the value of 86,827 dols., and of canned salmon to the value of 70,233 dols., these figures in both cases comparing with nil in the three preceding years.

AGRICULTURE IN BOMBAY.

The following summary of the progress in Agriculture in Bombay has been furnished by the Director of Information in Bombay:—

Agriculture is still by a very long way the leading industry of India, for it supports more than 80 per cent. of her people.

Some little time back there was a meeting of the Bombay Provincial Agricultural Board at Poona. Important agricultural problems were considered at this meeting, such as the results achieved by the Agricultural Department, the improvement and financing of cotton crops, the prevalence of infections diseases among cattle intensive cultivation of land, improvement in the supply of manure and the cheapening of Railway freights on the same. The proceedings, the papers submitted, and the discussion thereon have now been published by the Bombay Government in the form of a convenient and well produced Blue Book.

Mr. Keatinge, the Director of Agriculture, in his paper dealing with the technical results attained by his Department showed that careful testing and experimental work had evolved systems of good clean tillage, proper rotation of crops and adequate manuring, on the various Government farms and that the results of these operations are satisfactorily evidenced in the excellent crops obtained. The Department has experimented with a large number of new implements, and adopted those which proved most suitable to the needs and circumstances of the cultivators. The cultivators have taken up extensively the various patterns of ploughs which after extensive tests by the Department, where recommended, and to a less extent harrows seed drills, sowers, threshers, and levellers as well as the improved furnaces, pans and other apparatus necessary gur making.

In the matter of artificial manures it has been shown that standard mixtures can be applied with

plantains and potatoes. The Department farms have also introduced dry crop groundnuts of various kinds which are not only a valuable crop, but are excellent as a rotation for cotton or jowari. The agricultural engineer has located extensive sources of underground water in Upper Gujarat and parts of Thana District, sufficient to turn these areas into a garden.

During the discussion upon this paper, the Hon. Diwan Bahadur Godbole said that every effort should be made to apply the approved methods to the cultivators own fields when these had been adapted to their own resources. He instanced a case in Berar, where a farm which formerly produced only Rs. 7,000 worth of cotton was made to produce cotton worth Rs. 23,000. In reply Mr. Patil, one of the Deputy Directors of Agriculture, said that the Department were already demonstrating their improved methods in cultivators' own fields; and he instanced 40 cotton plots in Khandesh, 40 sugar-cane plots on the Deccan Canals and many others.

Dr. Harold Mann discussing the improvement of the supply of manures for intensive cultivation said:

"Last year the consumption of sulphate of ammonia in this Presidency amounted to only 600 tons, but if its price goes down a bit there will soon be a demand for 2,000 tons or more a year. He protested against the very high cost of railway freight and it was ultimately resolved to approach the Government to ask Railway Companies to charge minimum rates of freight on the carriage of manures.

In advocating a systamatic fight against infections diseases among cattle, Mr. Taylor of the Veterinary Department said that the loss in cattle due to these diseases amounts to nearly Rs. 50,00,000 in 5 years in the Presidency proper. During the discussion of Mr. Taylor's paper, several members including the Hon. Mr. Purshottamdas Thakordas and Mr. Keatings expressed regret regarding the slaughter of milch cows in Bombay, which are sold to butchers when they go dry. In this connection, it will be remembered that the Bombay Government accepted the Hon. Mr. Purshottamdas' resolution in the Bombay Legislative Council last September, regarding the prevention of slaughter of cattle in general and of milch cattle in particular.

The proceedings of the Bombay Provincial Board of Agriculture, as the volume is entitled, is issued at the price of annas 10 and may be obtained from the Government Book Depot, Poona. It is a publication which will be found of interest and value to all who are in any way concerned with Agriculture.

CO-OPERATION.

Bombay Report.

The problem of rural stagnation in India, attracted much attention towards the end of the last century. The Bombay Government were among the first to recognize its importance and as early as in 1883 they took steps to help on a scheme for the organization of an agricultural bank. As, however, the Secretary of State took exception to the scheme, and as Acts like the Deccan Agriculturists Relief Act (1879), Land Improvement Loans Act (1883) and Agriculturists' Loans Act (1884) were passed with the same object in view, the Bank scheme was allowed to drop.

The Madras Government deputed Sir Frederick Nicholson to Europe, to study the movement for organizing rural credit there. He summarised his conclusions in the words 'Find a Raiffeisen,' by which he meant not only that rural credit societies such as those started by Raiffesien in Germany should be started, but also that genuine and devoted enthusiasts like Raiffesien were needed for the work. A few officers then started credit societies in some parts of India, but Lord Curzon, realising the importance of co-ordinated effort, appointed a committee under Sir Edward Law to suggest lines for the necessary legislation.

As a result of the deliberations of this Committee the Co-operative Credit Societies' Act was passed in 1904 and the officers then lost no time in setting to work. An idea of the progress made may be gathered from the fact that the number of Co-operative Societies in the Bombay Presidency, which was only 12 with a membership of 219 an 1904, rose steadily to about 2,400 during 1919-20; and this in spite of the war conditions, bad seasons and the banking crisis. The Co-operative Societies' Act was later on amended in 1912 and its scope widened.

Last year's report for Co-operative Societies in the Bombay Presidency contains two remarkable features. One is the classification of Societies into three groups or types as (a) Resource Societies, (b) Consumers' Societies (including Building Societies) and (c) Producers' Societies. This made easy the solution of the question as to which kind of Societies should be financed by the Provincial Co-operative Bank. The view was put forward by the Provincial Bank that while its first duties were to agricultural Co-operation, yet it can, under proper safeguards, finance all resource societies when required; but it

could not reasonably have any dealings with other groups and in particular with consumers' societies. This view was approved by the Government of Bombay. This convenient classification was suggested by the Registrar, who based it on investigations he had made in France.

The bulk of the Co-operative Societies are agricultural Credit Societies. In the year under report their number rose from 1,648 to 1,993, and their working capital from 81½ lakhs to nearly 108 lakhs. The growth of the reserve funds is perhaps the easiest test of the success of Agricultural Credit Societies and the funds have during the year grown from 5½ lakhs to 7½ lakhs.

Fully admitting the impressiveness of these facts, there are a certain number of thoughtful co-operators who have been inclined rather to doubt whether the provision of easy credit, unaccompanied by improved agricultural methods, has not actually done harm, by inducing a certain habit of extravagance, and a certain callousness to debt. All people concerned with the movement must, therefore, thoroughly grasp the principle that the provision of credit to cultivators is of real benefit *only if the credit is used to obtain increased production*.

The best, if not the only way to secure this increased production is by organizing non-credit societies to procure the cultivator the necessary resources in improved agricultural requisites. There were in the year under report only 102 non-credit agricultural societies, of which 26 were for the supply of manure, 19 for the supply of seed, and 13 for the supply of implements; 6 were dairy societies, 14 for cattle breeding, 4 for cattle insurance, and 18 for the sale of cotton and other agricultural produce. The condition of some of these Societies, such as the dairy societies and the cattle insurance societies, is very diasppointing. Steps have, however, now been taken to establish a closer touch between the Co-operative Department and the Agricultural Department. It is moreover contemplated to employ agricultural graduates as organizers under the Assistant Registrars. The whole question is going to be further ventilated and discussed at the next Provincial Conference. A hopeful feature of the Agricultural Credit movement this year is its extension in Sind, in spite of great difficulties.

By far the largest number of non-agricultural Credit Societies exists in Bombay itself. It is to be regretted that the large towns of Poona and Ahmedabad have not followed this example to any extent worth mentioning. At present practically no banking facilities exist anywhere except in the Presidency City. It is hoped that the Urban Credit Societies will succeed in providing those facilities which are so

this group is that of the Weavers' Societies, weaving being the only cottage industry with regard to which the Co-operative Movement in this Prosidency has made progress. These societies seem to have recovered from their previous year's bad condition much more rapidly than was anticipated.

There are now 16 Central Banks in the Presidency as compared with 12 during the last year. These banks are intermediaries between the primary agricultural societies of an area and the Provincial Bank; they are, therefore, expected to play the most important role in the control and finance of agricultural societies. The result of last year's work of the Bombay Central Co-operative Bank, which is really the Provincial Bank of this Presidency, were satisfactory, and as the finance of the whole movement depends ultimately upon the management of this bank, the thanks of all concerned are due to the Board and the Manager. Reviewing the Rosource Movement as a whole, it has been pointed out that its reserve fund amounted to 13·20 lakhs and the profits to 5·89 lakhs. The movement has done a great service to the country by bringing into circulation money which a few years ago would have been kept in hoards, and would have been lying unproductive.

With regard to the Consumers' Movement, the number of stores is still only twenty. But this branch has been taken in hand only recently, and from December last a special Assistant Registrar has been appointed to encourage the movement. A Wholesale Society has also been organized in Bombay.

The organization of Co-operative Building Societies has made very good progress this year, for which credit is due to the Bombay Co-operative Housing Association, and its energetic Secretary Rao Bahadur Talmaki. Fourteen new Societies were organized during the year. The movement is, however, faced by a very real difficulty in the present heavy cost of labour and building materials. These Societies also require expert guidance in Engineering and legal matters.

A special feature of the Co-operative movement in this Presidency is the help it has received from non-official workers in the organization of new Societies. The Central Co-operative Institute, which is a non-official body instituted for focussing all non-official Co-operative activities, did extremely useful work during the year by means of its Co-operative journals, training classes, lectures, etc. A Provincial Conference was held at Poona in September, and was opened by His Excellency the Governor. There were some ten small conferences organized by various local co-operators, at their own expense, the Department making a supplementary grant wherever necessary.

The Government of Bombay has consistently befriended and supported the Co-operative movement, as being the true key to rural reconstruction and progress in this Presidency. It has always welcomed warmly non-official effort, and now that the department is to pass into popular control, it is the more necessary that the public generally should realise the importance, and the great potentialities of the Co-operative movement in Bombay Presidency.

BOOKS IN BRIEF.

Life and Labour in the Nineteenth Century—*By C. R. Fay, Fellow and Lecturer of Christ's College, Cambridge. Published by the Cambridge University Press. Price 20sh. net.*

Mr. Fay is so well-known a writer in the field of co-operation and co-partnership that his present work requires but few words from us to commend it to the attention of our readers. It contains the substance of lectures delivered at Cambridge in 1919 to students of economics, among whom were officers of the Royal Navy and students from the army of the United States. The first part of the book deals with the international background 1815—1830, with the influence of Bentham, Robert Owen and Cobbett, and with the old poor Law and the new. The second part reviews the political background from 1830 to the present day and the industrial scene in 1842. Cobdenism, Chartism, Capitalism, Socialism and the Co-operative Movement are discussed and the last two chapters deal with the Remedies of the XIX Century and the growth of Co-operative Life. It is desirable to add that readers who are business men will do well to commence with Chapter XIV of the book (which is headed "The Industrial Scene, 1842", and read through it to the end. There, as Mr. Fay points out, they will find what he conceives to be—from an industrial standpoint—the heart of the matter. We have space only to refer to a few points mentioned in this carefully written book. In the Chapter (XX) on the "Revival of Socialism", Mr. Fay sets out the causes which have contributed to the extraordinary influence of Karl Marx on English working class thought. The last section of this chapter is devoted to a comparison of English and continental Socialism. Chapters (XXI) and (XXII) ought to prove a corrective to many who think that Government has not kept pace with ideas of social reform in England. Altogether, this is a valuable and scholarly study of life and labour in XIX Century England and ought to be welcome to all interested in modern industrial conditions, their origins and their history.

Free Trade, The Tariff and Reciprocity.—*By F. W. Taussig, Ph.D., L.L.B., Litt. D. Henry Lee Professor of Economics in Harvard University and some time Chairman of the United States Tariff Commission. Published by the Macmillan Company, New York. Price $2000.*

The question of tariffs and reciprocity is no longer one of those for academic discussion in this country. It is one of practical politics. This book by perhaps, the greatest authority on tariffs in America, will therefore be welcomed by all interested in the subject. Tariffs have long been known in America but the War has given a new meaning to the whole basis of the argument supporting their imposition. Professor Taussig discusses the topic under various heads, some of which are the following:—The Present Position of the Doctrine of Free Trade; Abraham Lincoln on the Tariff: A Myth; How the Tariff affects wages; Wages and Prices in Relation to International Trade; How to Promote Foreign Trade; Reciprocity; Cost of production and the Tariff; How Tariffs should not be made; The Proposal for a Tariff Commission; and Tariff Problems after the War. As may be expected Professor Taussig discusses the various aspects of the Tariff problem in a masterly manner. His reputation for lucidity of expression already so high, will be greatly enhanced by this publication. We cannot think of an equally good book on Tariffs and would heartily commend Professor Taussig's as both informative and practical. We will allow ourselves the pleasure of quoting only one passage from his book. Writing in his final chapter on "Tariff Problems after the War" on the topic of "Essential articles" he observes:—"The sort of economic warfare and would-be strangulation implied in the quest for control of essential materials and 'key industries' is to my mind abhorrent. It is not to be thought of as part of a peace that shall really terminate the great War. But if it must be faced as among the possibilities of an inconclusive settlement; the United States is in a stronger position to let it go on than any other country."

Mercantile Credits and Collections.—*By Charles A. Meyer—Published by the Macmillan Company, New York. Price $3'50.*

The is a thoroughly practical book by an experienced credit man, on mercantile credit and collections. There is so much that is good in it that we would heartily commend it to business men. The heading of one chapter—and we have read through the whole of it carefully—will show how eminently practical is Mr. Meyer's work. We have in mind when we write this, chapter VII of his volume which is entitled "Converting Doubtful Orders into Good Ones, and the use of guarantees." It solves for the practical business man the great question: How to get the cash by tact? The rest of the book is cast in the same mould. We should like to see the book widely used in this country, especially in the commercial and banking circles.

Common Commodities of Industries—Silver—*By B. White, F. R. St. S. and F. R. Econ. S.—Published by Sir Isaac Pitman & Sons Ltd.—London. Price 3sh. net*

This little volume on "Silver" will be found to be both useful and comprehensive. It is a matter for congratulation that Mr. White has been able to crush into the space available for him such a mine of information about silver. Mining, marketing, industrial consumption, its utility as money, are among the topics dealt with by him in the book. The insets enhance the value of the volume. We have no doubt that it will attract the attention that its merit deserves.

ACKNOWLEDGMENTS.

A Comparative Study of the Educational Statistics of Denmark and Mysore. *Issued by the Board of Education, Mysore Economic Conference.*

Oxford Tracts on Economic Subjects. Nos. 1—7. *Printed in England at the Oxford University Press, by Frederick Hall and Published by Humphrey Milford, Amen Corner, London, E. C. 4. Price 1½d. each.*